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ORIGINAL ARTICLES.

AMERICAN MEDICAL ASSOCIATION.

SECTION OF ORAL AND DENTAL SURGERY.

The Section was called to order on Tuesday, May 5th, 1891, by Dr. E. S. Talbot, of Chicago, Ill., the Chairman of the Section of Dental and Oral Surgery of the American Medical Association.

Dr. Talbot: The first thing necessary to be done will be to elect a Secretary. Dr. Morgan is unable to be with us at this Section, and so we will have to appoint a Secretary. I propose Dr. Custer.

Dr. Custer: I would rather you would have some one else.

Dr. Talbot: There are no minutes to be read and the duties will not be arduous. Those in favor of Dr. Custer being appointed as Secretary will signify aye.

This motion was seconded and passed unanimously.

Dr. Talbot: It may seem to some of those who are present that the numbers are rather small; but having attended all the meetings since the Section was organized ten years ago, with the exception of one, I can say that it never was intended that there should be a large number attending these meetings. It was intended that those that were invited to read papers should be men of unusual scientific qualities; and that the papers should have their effect upon the medical profession by being published. For this reason the Society has never catered to a large gathering; but there are quite a number of dentists in the city, and to-morrow we may expect to have a larger gathering. There are no minutes to be read; the Section simply keeps a record of the papers that are read at the meeting in a book, and the minutes are not intended to be reported at all. We will therefore dispense with that matter, and the first order this afternoon will be the Chairman's address. I will call Dr. J. L. Williams, of Boston, to the Chair *pro tem.*

Dr. Talbot then read

THE PRESIDENT'S ADDRESS.

Gentlemen:—Dentistry from the earliest period up to the present time has been practiced by medically educated men.

Hippocrates, 460 B. C., speaks of dentrifices and the fixing of the teeth; Celsus, at the end of the first century; Ætius, in the sixth; Egenolff and Ambrose Paré, in the fourteenth. All mention certain forms of treatment of the teeth. John Hunter, 1728, spent much of his time in the study and treatment of the teeth, as well as the study of general anatomy; Fouchard, 1747; Bourdet, 1786; Fox, 1814; Catalan, 1826, all practiced dentistry and also wrote extensively on dental subjects.

The instruments for dental as well as surgical purposes which are to be seen in the museums of Europe, together with the beautiful specimens of Etruscan and Phœnician dentistry now in the possession of Drs. Van Marter of Rome, Barrett of Buffalo, and Taft of Cincinnati, and which are similar to those made to day, are striking illustrations of the superior ability which men of early times acquired.

About 1826-1830, the practice of dentistry was not wholly in the hands of an enviable class of individuals. Many were watchmakers, barbers and tinkers of various descriptions, who had taken up the practice for the money that was in it, and were roaming about the country extracting teeth and inserting artificial ones, regardless of honor and ability.

There were, however, a few medical men practicing dentistry, who had obtained a high standing in their chosen profession, and who were anxious to hold their special calling upon an equal footing with other branches of the healing art. Among those, whose names stand out conspicuously in the history of the country, are. Parmley, Brown, Hayden, Tucker, Hudson, Greenwood, Maynard, Trenon, Harwood, and Chapin A. Harris and Keep.

We can easily imagine the feeling of these men, who by reason of superior skill and ability had attained high positions in their chosen specialties, when they met in council together to discuss the different subjects relating to the standing of the calling with other specialties, and the qualifications for admission to their Society. It

was not until 1839 that any movement was made on the part of these men to elevate their specialty from the slum in which a majority of the so-called practitioners were holding it. It was at this period that one of the most important events in the history of dentistry occurred.

The *American Journal of Dental Science* made its first appearance, with Dr. Chapin A. Harris and Eleazer Parmley as its editors. The American Society of Dental Surgery was organized in 1840, also through his efforts in coöperation. In connection with these movements, it was the ambition of Dr. Harris to organize a dental school in connection with the Medical Department of the University of Maryland. The practice of dentistry (at this time), with few exceptions, being at a very low ebb, did not impress the faculty of the University as being of sufficient importance to be considered a part of the healing art. The request of Dr. Harris was therefore rejected. Whether this request, at this period in the history of dentistry, would have been rejected by the faculty of any other medical college in this country, or whether it would have been rejected if presented to the Medical Department by any other person, or at any other time, we have no means of knowing. Nor do we know much of the general feeling among physicians at that time, in regard to the relation of dentistry to medicine. We only know that the rejection of the proposition gave Dr. Harris new energy, and as a result the Baltimore College of Dental Surgery was established, and that the School of Medicine and the School of Dentistry ignored each other for a time.

Whether the establishment of a strictly dental school, together with the conferring of a separate degree from that of the medical school, has benefited dentistry, it is difficult to say.

The original idea of Dr. Harris, if it could have been successfully carried out, would no doubt have placed dentistry as a calling upon a higher plane than it occupies at the present time. His idea was that by this union the Dental Department, being a legitimate specialty of medicine, would thus draw support from the medical profession at large. Be that as it may, dentistry, forced upon its career with a new degree, had, with very little aid from the medical profession, to work its own way as best it could. This incident marked one of the greatest epochs in the history of our calling.

Like the young man, sent away from the parental roof, dentistry has grown strong in some of its features. The Baltimore College, owing to the talent of unexceptionally able men, flourished, and men of ability were graduated, who practiced dentistry in different parts of the country, with the new degree of "Doctor of Dental Surgery." So successful was this college, that other schools of dentistry were organized shortly afterward, and these in their turn became as successful as the mother school.

From the first, graduates of dentistry who were ambitious to excel have never been satisfied with a dental degree only, and many men, anxious to acquire higher attainments, have taken the medical degree also. Many of the graduates are anxious to acquire a broader and more liberal education, but time and purse do not permit it.

Dental students have been ambitious to obtain the highest acquirements, and, in many cases, have not been satisfied with the course of instruction in our dental colleges. The dental faculties have been obliged to so shape their course and so far as possible have made arrangements with medical colleges, that by taking one additional course, their students could receive the medical as well as the dental degree. And there has been a desire on the part of both medical and dental graduates to draw the medical and dental schools together, as evidenced by the fact that medical men are anxious to secure positions in the dental colleges. This desire may not have been outwardly intentional on the part of some, but the relations of one to the other are so close that scarcely any distinction really exists. I have frequently heard medical men, those who have had experience as teachers in both colleges, say that they prefer to lecture to dental students.

The first dental college to unite with a medical college was the St. Louis College. The St. Louis Dental College was founded in September, 1866, and the first announcement stated that the students will have the benefit of the lectures in anatomy, chemistry, physiology and materia medica that are given to the matriculants of the St. Louis Medical College, the first college to take the step in this direction.

Following this, in 1867, the Harvard Dental School was organized in connection with Harvard University; since that date most of the universities in this country have established dental departments. The older dental colleges are uniting themselves as rapidly as possible to universities, so that at the present time nearly one-half of the dental colleges are departments in the different universities. Ever since the formation of the Massachusetts Medical Society, in 1781, it has had members practicing dentistry; and the Suffolk District Medical Society, which is a part of the Massachusetts State Medical Society, created a section in 1866 called No. 5, for "Surgery and Dentistry;" this is now a quarter of a century old. In Massachusetts, forty or fifty years ago, no reputable dentist would take a pupil, unless he would engage to take a full medical course, or had already graduated in medicine. Scarcely a dentist who has been in practice for twenty-five years, and who has sons growing up, is not anxious to have them to take a full course in medicine before taking up the subject of den-

tistry, which they regard as a specialty in medicine.

This brief history has been given to show that our best educated early practitioners in dental surgery have always regarded it as a specialty in medicine rather than an independent profession. Dr. Harris so regarded it, and he was the founder of our first dental college, and established this college for the reason that he was not permitted to organize a dental department in a medical college, as he preferred to do. This is evidenced from his inaugural address at that time.

"Allow me," he said, "to observe, however much of interest or curiosity the establishment of this institution may have awakened, it constitutes an era in the history of a most useful and valuable department of medicine."

In speaking of the empiricism that had up to that time existed in the practice of dentistry, he says: "I feel bound to the public and to my own reputation, to denounce the empiricisms that have, and do still exist in the department of medicine." Again he says: "It is to be hoped that the day is not far remote when it will be required of those to whom this department of surgery is intrusted, that they shall be educated men."

Although dentistry apparently seceded from the mother profession in 1840, it was so near akin to it that, with few exceptions, there has been a yearning on the part of the dental graduates to return to the parental roof. Many graduates of dentistry have availed themselves of the opportunity, and the numbers are increasing every year.

With the convening of this meeting, the Section of Dental and Oral Surgery in the American Medical Association enters upon the tenth year of its existence. At the session of the American Medical Association held in Richmond, Va., 1881, Drs. W. W. Allport, J. W. Brophy, E. S. Talbot, Chicago; Dr. J. L. Williams, Boston; Dr. G. L. Goodwillie, New York; Dr. Hauxhurst, Grand Rapids, Mich.; and Dr. G. L. Parmlee, Hartford, Conn., practitioners of dentistry, holding medical degrees, presented themselves as delegates from local medical societies, for the purpose of organizing a Section on Dental and Oral Surgery. Each gentleman constituted himself a committee of one to champion the movement among the members of the Association who were in attendance. They found no opposition whatever; on the contrary, the oldest members, and especially the ex-Presidents of the Association, were heartily in sympathy with the movement, and were anxious to assist in bringing it about. At the morning session Thursday, May 5, Dr. Samuel D. Gross, of Philadelphia, asked for a suspension of the regular order of business, which motion was granted. He then moved that the By-laws of the Association be so amended as to create another Section, to be known as No. 7, entitled Dentistry. The motion was favored by Dr. Sayre, of New York, and Dr. N. S. Davis, of Chicago, and was adopted. The object of suspending the rules at this time, was for the purpose of creating the Section, so that we might organize and commence work at that session; the members who were to constitute the Section being prepared with papers for that purpose. Dr. Toner, of Washington, objected, saying that he was not opposed to the Section organizing and commencing work this year, but he did not wish to make a precedent for future Sections. It was therefore decided that it could not go into operation until the next year, when, according to the Constitution and By-laws of the Association, dentistry was officially recognized by the American Medical Association.

The effect that this movement produced upon the so-called dental profession was, in one respect, magical. Before this period, scarcely a meeting of dentists convened, without having upon its programme a paper upon the subject of "Is Dentistry a Specialty in Medicine?" Strange as it may seem, many took the ground that it was not, ignoring the fact that it had been practiced as such until, and by some within, the last forty years; that many of its branches were taught by medically educated men, and also that we were practicing upon a part of the human body. Since this period, scarcely a paper has been written upon this subject. The action taken by the American Medical Association, as well as cases which have been lately decided by the courts, have legally settled the question forever.

Fortunately, there is little opportunity for wire-pulling or scheming for political preferment in our Section, for it is well known that the majority of our members prefer that the offices be given to others than to themselves. Thus the time devoted to the Section has been entirely given up to the reading and discussion of papers, and in no dental society in this country, has there been presented such an array of scientific papers as has been given in this Section. The men who have taken part in the meetings of this Section have in most cases been of exceptional ability, and whose standing in the specialty has added dignity to its meetings. The influence of the work in this Section upon the medical profession has brought about a marked change in the Association.

The Section of Dental and Oral Surgery is recognized as a part of the whole, like other Sections, and its members exert as much power in promoting the welfare of the body, as do the members of other Sections. Indeed, the members of this Section have had the pleasure of listening to papers and discussions at its sessions, by some of the ablest men of the Association, which not only added interest to its meetings, but also showed that the members of the Associ-

ation are in full accord with the specialty as a part of the general body.

Since the organization of the Section, editors of medical journals have become quite liberal, as well as more intelligent, in their discussion of dental subjects, and have taken more interest generally in the affairs of dentists; and physicians have accepted invitations to read papers before local dental societies, and dentists have read papers before medical societies. This shows the interest which an interchange of thought is developing, by the union of the different branches of the healing art. Since the formation of this Section, through the efforts of W. W. Allport, teaching in regard to dental diseases has been established in many of the medical colleges of Chicago, which example has been followed in other colleges in the country. One of the arguments used by some dentists against the theory that dentistry is a specialty in medicine, was that the medically educated person knew nothing of dentistry, or those diseases of the oral cavity which result from diseased teeth. Medical men could hardly be expected to know much in regard to the lesions of the mouth, they having received no special instruction upon this subject. The action taken by Dr. Harris and the medical faculty in 1840, no doubt impressed the faculties of other medical colleges with the idea, that lesions of the mouth resulting from diseased teeth were of little consequence, and therefore knowledge of them of little value, to the general practitioner.

Now however, medical men, as well as dentists, know that many lesions of the body are the direct outcome of diseased teeth. In my capacity as a dental teacher in a medical college, I have instructed the students for the past eight years that (in my opinion) many of the diseases of the body, such as pneumonia, consumption, typhus and typhoid fever, eruptive fever, suppuration of the throat and tonsils, aphthæ, ulcers, etc., were the outcome of a collection of microorganisms in the mouth, and decay of the teeth. My reasons for this theory were that, in many instances in my practice, I have observed patients entirely recover from supposed consumption and other bodily ailments, after the mouth has been put in a healthy condition. In one case a lady gained 35 lbs. in weight, a young man gained 13 lbs., and a young girl who had been treated for six months for consumption, and was supposed to be on her death-bed, entirely recovered after having a number of roots of teeth removed and tonics administered. This theory has been confirmed by Professor Miller, of Berlin, who has observed the bacillus tuberculosis and the bacilli of other diseases in the mouth. In his work upon "Microörganisms of the Human Mouth," he shows how many diseases of the body are produced by pathogenic bacteria by inspiration, absorption, and being taken into the alimentary canal, which have accumulated in the mouth. To-day many of the medical colleges of the country have a chair upon dental and oral surgery, and the students are now taught dental anatomy, physiology and pathology. Of the six medical colleges in Chicago, there is not one that does not provide for instruction in these branches by some dentist. No medical student should be allowed to graduate without some knowledge of the laws of diseases, and their effects on the mouth and teeth, and no medical college to-day can be considered complete without a chair upon this subject. In view of the fact that able practitioners of dentistry were debarred from becoming members of the American Medical Association, on the ground that they did not belong to some local medical society, at a meeting held in Chicago, in June, 1887, Dr. Allport conceived the idea of having a resolution passed, which should admit as members men of ability who held the D.D.S. degree.

With the assistance of Dr. N. S. Davis, the following resolution was presented and unanimously adopted by the American Medical Association, 1887:

Resolved, That the regular graduates of such dental and oral schools and colleges as require of their students a standard of preliminary or general education, and a term of professional study, equal to the best class of the medical colleges of this country, and embrace in their curriculum all the fundamental branches of medicine, differing by substituting practical and clinical instruction in dental and oral medicine and surgery, be recognized as members of the regular profession of medicine, and eligible to membership in this Association, on the same conditions and subject to the same regulations as other members.

In the following year, 1888, the Chicago Dental Club, having adopted the Code of Ethics of the American Medical Association, sent the following members to the Association, as qualified under the resolution: W. W. Allport, A. E. Baldwin, John Marshall and E. S. Talbot; and since that year, 1888, the Dental Club has continued to send members to the Association. The adoption of this resolution by the representative Society of the country, would seem to show that the medical profession had done its full part to recognize *properly educated* dentists as legitimate specialists in the practice of medicine. The question of relationship has now been definitely settled forever, and the only question now remaining is this: What proportion of dentists, in the future, will so qualify themselves to practice dental and oral surgery, that they will have the right to be classed as medical specialists, the same as surgeons and ophthalmologists, and entitled to recognition in the Association, in accordance with the letter and spirit of the resolution referred to?

Professor Garretson, in a letter to me, states that in the Philadelphia Dental College, which is in connection with the Medico Chirurgical College, the following distinction is made between

the course conferring the D.D.S. degree and the one conferring the M.D. degree, or both: On matriculation, the student signifies his intention to take the M.D., or a dental degree, or both. If he chooses the course conferring the dental degree, he is taught only such branches as pertain to the treatment and filling of teeth. On the other hand, if he signifies his intention to take the M.D. degree, or both, he receives instruction in the branches that will fit him to practice oral surgery, or oristry, and medicine, as well as dental surgery. The professional position that the educated dentist occupies at the present time, could not be improved upon, as is true of the position he holds in society. His relations with the mother profession are as free and broad as the air of this great American Continent. It now remains for him to decide whether he will be satisfied with little education—with an education that permits him to see only faintly, and to realize not at all, the possibilities of his profession, and renders him content to grope along in the lower stratum of his practice, seeing and wishing nothing higher, possessing only narrow views in regard to his calling, attending no societies, or only those whose time is given to discussions on such subjects as red rubber, amalgam and root filling, extraction of teeth and insertion of artificial dentures. If he is content with these things, and looks upon the profession of dentistry as a trade, merely as a means of subsistence, with as little expenditure of power and thought from himself as possible; will he rest satisfied with this position, or will he take a broader view of the situation, looking at dentistry from all sides, thinking the subject worthy of all his power, all his talents and ability, striving to make it equal to the mother profession, and educating himself so that he may stand upon an equal footing, shoulder to shoulder with the best medical men in the country?

Some one may say that he has not the time nor the money for this. In answer to this, permit me to refer to a Professor in the University of Berlin, to show that it is possible for a poor American boy to *educate* himself for the practice of dentistry.

His worth was recognized by the faculty of the University of Berlin, and a position was offered him as Professor in the University, an honor that has been accorded to no other American. And during my late visit to Berlin, it gave me great pleasure to observe the respect shown by the faculty of the University, Government officials, as well as the highest officer in the International Medical Congress, to Professor W. D. Miller. This example is only given to show that to him who works in the right direction, all things are possible, and the higher he places the limits of his attainments, the greater will his attainment be.

Let the dentist be a scientist, and not a mediocre and narrow-minded tradesman. Let him select a new mark every day, at which to aim his energies and talents, and let that mark be ever ahead, and ever on a higher plane.

Dr. Williams: Unless the writer invites discussion, we will simply pass the paper as it is.

Dr. Talbot: The next paper upon this programme is by Dr. Wm. Carr. In order to facilitate the reading of papers it has been decided to set apart to-morrow afternoon, from three to half past five, for the purpose of hearing papers by Dr. George S. Allen of New York, and Dr. R. R. Andrews of Cambridge; and we have a paper by Dr. A. H. Thompson, of Topeka, Kansas. Dr. Thompson was unable to be present.

Dr. Marshall: Mr. Chairman, I would move that a committee of three be appointed to whom the papers shall be referred before being read.

Dr. Williams: It is customary, I think, to appoint a committee of three.

Dr. Talbot: The motion has been made that a committee of three be appointed, which is always customary in the Sections, to whom the papers shall be referred before reading. I will appoint Drs. Williams, Marshall and Andrews.

Dr. Marshall: It happens, Mr. Chairman, that each one of that committee has a paper of his own to read.

Dr. Talbot: I will refer those papers, then, to members of other committees. I would suggest to those who have papers that they submit them to the committee for approval. That is a matter of form. What shall we do with Dr. Thompson's paper; shall it be read this afternoon?

Dr. Marshall: I have been looking it over. It is interesting from the standpoint of a comparative dental anatomist. It is on that subject. It will take too long now to submit this paper to the approval of the committee, and I have not quite finished reading it.

Dr. Noble: I would like to remark that Dr. Edward Maynard died last evening, and I feel it would be highly proper for you to take, at this very first meeting, some steps in reference to his death, and that proper resolutions should be drafted and that a delegation be appointed.

Dr. Andrews: I did not know he was so near death. I think the suggestion a good one.

Dr. Noble: I presume the announcement of his death will probably be in the evening papers. At the last meeting of the Section in Washington I know there were quite a number who took a great deal of pleasure in visiting Dr. Maynard, and I think he came to one of the meetings. He certainly was a man deserving of respect and appreciation. I should hope that some action shall be taken.

Dr. Williams: I move that a committee of three be appointed to draft suitable resolutions on the death of Dr. Maynard.

Motion seconded and passed unanimously.

Dr. Allen: I would like to include W. H. Atkinson with Dr. Maynard.

Motion seconded and passed.

Dr. Noble: I wish to say that our old friend Dr. Maynard came to this city about thirty-five years ago. I came here as a young man and as a student, and I well remember at that time with what veneration we looked up to Dr. Maynard, who was then in the very height and pride of his national reputation. I wish to bear personal testimony to his wonderful skill with his fingers; his manipulative ability, not only in the matter of filling teeth, but his knack in the way of using tools and instruments in the laboratory. One of the most wonderful men I ever knew with reference to executing what his brain thought out; and we all know what a large brained man he was; and that for many years he was looked upon as one of the leaders in our profession in all things that pertain to advancement in the way of mechanical appliances. He was one of the first to thoroughly remove the nerve, and probably with more thoroughness than was done before or for some years afterwards. This was mainly due to the care which he took in preparing the fine nerve broaches which we are now familiar with. I also feel proud of having his name on my diploma along with that of Drs. Harris and Bond. I think there is only one man living that was on my diploma, and that is Professor Sterner. I feel deep sorrow to hear of the death of Dr. Maynard. Of latter years you have not heard very much of him, and I am sorry to see there has been some language used with reference to Dr. Maynard that seems to me uncalled for; that he has not taken an active part in societies, his age preventing. I hope we will always be ready to say, peace to the ashes of Dr. Maynard; for he certainly was deserving of veneration. As an operator he stood at the very top of our profession. He was always dignified, and as we all know bound up with our profession.

Dr. Talbot: Those in favor of the resolution offered by Dr. Williams, please manifest by saying aye. Seconded and passed unanimously.

Dr. Talbot: I will appoint on that committee Dr. Noble, Dr. Allen and Dr. Williams.

Dr. Marshall: Mr. Chairman, I have been over the paper of Dr. Thompson's and think I can get through it.

Dr. Talbot: The next paper then in order will be that written by Dr. A. H. Thompson of Topeka, Kas., on "The Teeth of Invertebrate Animals." It will be read by Dr. Marshall.

Dr. Marshall: This claims to be a type-written copy of the paper, but whoever did it did not know very much about typewriting. It is not well printed and it is on extremely thin paper, and I can only see it by holding it in a rather awkward way; so that if I stumble it will be because of poor printing.

(Dr. Marshall then read the paper.)

THE TEETH OF INVERTEBRATE ANIMALS.

BY ALTON H. THOMPSON, D.D.S.,
OF TOPEKA, KAN.

The resources of Nature are infinite. The expedients to which she resorts are marvelous and endless in their variety. When new conditions are to be met, her invention is never at a loss, and her capacity for change is boundless. Environments change and corresponding alterations in organs arise to meet the new conditions presented. The life of a species depends upon this power to change, to conform to new environments. The law is adaptation or extinction.

In no set of organs—in animal life at least—is this infinite variety of resources, or the capacity for change, or the power of invention, so fully illustrated, as in the teeth. Food selection has created a wonderful variety of forms of teeth which have arisen in response to changes in the food environment. Those species which could conform to gradual change, survived and transmitted the acquired modifications in the dental apparatus. Those which could not change, perished; or escaped to a more favorable food environment. From such causes many variations in the teeth of animals arose in the course of the geological ages, and, taking the living and the extinct species altogether, the number and extent of these variations is beyond estimation. The variety presented in the different forms of teeth and masticating apparatus throughout the animal kingdom, illustrates and exemplifies the fact that these organs are susceptible of great variation, and that the possibilities of change and the invention of Nature, are especially marked in these organs.

If vertebrate animals present great variations, and many extraordinary forms and interesting extremes in the structure of the dental armature, so also do the invertebrate animals, although these are not so well known. To the naturalist and the philosopher the latter are equally interesting, however, and serve to enlarge our views of the wonders and beauties of nature. To the dental student the teeth of invertebrates are interesting from the comparative standpoint, and serve to illustrate the remarkable possibilities of dental variation, and help to better understanding of the principles of the mechanical evolution of the teeth of animals. In such studies, any knowledge is valuable which may contribute, even remotely, to a better understanding of the important organs which we are called upon to preserve, and thus better prepare us for our chosen work. The study of comparative anatomy is of great value for the side lights it throws upon the teeth of man—their origin, evolution, mechanical design, etc.,—and therefore we claim that the

study of a branch, even as far removed from man as the invertebrates, is of sufficient value to warrant us in presenting a brief epitome of our knowledge of this branch; by way of stirring up an interest in it as an incentive to further study and investigation.

Professor Huxley says, "Anatomy of Vertebrates:" "When invertebrated animals are provided with teeth or masticating organs, the latter are either hard productions of the alimentary mucous membrane, are are modified limbs, as opposed to vertebrated animals, which also usually possess hard productions of the alimentary mucous membrane in the form of teeth; but their jaws are ordinarily parts of the walls of the parieties of the head, and have nothing to do with the limbs." The vertebrate jaw is part of the endoskeleton—the invertebrate jaw belongs to the exoskeleton, as do the teeth of all classes of animals, as illustrated by their embryology.

Mr. W. H. Dall says, "American System of Dentistry:" "Almost every large group of organisms below the vertebrates, until we reach the Moluscoidæ and lower radiated animals, exhibits in some of its members, one form or another of prehensile or masticatory apparatus connected with the alimentary canal. None of these exhibit true homologies with vertebrate teeth, though some of them present remarkable similarity to the latter in external relation. . . . They are divided into manibular and dental appendages in the sense in which the latter may be said to exist in the invertebrates. . . . Throughout the invertebrates the teeth are dermal structures, however much modified, and may consist of calcified connective tissue, of horny matter, or of chitin or an allied substance. . . . The teeth and jaws of mollusks, the nippers, mandibles and settac of worms, are composed to a greater or less extent of chitinoid material."

Prof. A. S. Packard says, "Standard Natural History:" "Hard bodies serving as teeth occur for the first time in the animal series, in the sea-urchins, where a definite series of calcareous dental processes or teeth, with solid supports and a complicated muscular apparatus, serves for the comminution of food. . . . Among the worms the organs of mastication for the first time appears in the Botatoria, where the food, such as infusoria, etc., is crushed, and is partly comminuted by the well marked horny and chitinous pieces attached to the mastax. In most other low worms the mouth is unarmed. In the leech there are three, usually in the annelids, two denticulated or serrate, chitinous flattened bodies situated in the extensible pharynx of these worms, and suited for seizing and cutting or crushing their prey.

"In the higher molluscs, such as the snails and others, besides one or more broad pharyngeal jaws, comparable with those in the worms—is the lingual ribbon, admirably adapted for sawing or slicing sea-weeds, or cutting or boring into hard shells, acting somewhat like a lapidary's wheel; this organ, however, is limited in its action, and in the cuttles, the jaws, which are like a parrot's beak, do the work of tearing and biting the animals serving for food.

"In the crustaceans and insects we have an approach to true jaws, but here they work laterally, not vertically, as in the vertebrates; the mandibles of the articulate are modified feet, and the teeth on their edges are simply irregularities or sharp processes, adapting the mandibles for tearing and comminuting food. The numerous teeth lining the crop of crustaceans and insects, serve to further comminute the food, keeping the larger particles back till finely crushed."

Professor Bradley says, "Manual of Compar. Anat:" "The lowest forms possess no teeth, except some ciliate infusoria, which have an internal cylinder of parallel rods for the mastication of food . . . In the Rotifera the denticles are in the shape of denticulated plates. The Echinodermata have five large teeth placed in the formidable apparatus called "Aristotle's Lantern." In the Annulosa the leech is the only member that possesses teeth, the semi-lunar plates imbedded in the muscular walls of the mouth; but the remaining classes have only mandibles and maxillæ which are very hard and chitinous. Among the Molusca, the Gasteropods possess a strap-like organ, the odontophore, which is studded with teeth. Cephalopods possess horny jaws which move vertically. Some other classes have denticles besides."

"In the Annelids (Dall, op. cit.) so-called teeth occur in many groups, but partake rather of the nature of jaws than teeth. This group comprises most of the worms, as well as the leeches. Their bodies are divided into more or less well defined, regular segments, and in general the jaws are on the second or buccal segment, or on a proboscis which is itself on the outer edge of this segment, and may be protruded from the mouth to a considerable distance. They are chitinous, most commonly paired, lateral and opposite, of almost infinite variety of forms, resembling in a general way the maxillæ of insects, and mimicing in miniature, hooks, combs, saws, rasps, claws, etc.

"In the leeches the mouth is provided with three lenticular jaws, with the projecting edges finely serrated, having a partly rotary motion about a point central to the three. The medicinal leech has two rows of serrations on each jaw.

"Among the crustaceans—lobsters, shrimps, crabs, etc.,—the maxillary organs are but modifications of entire limbs translated from the locomotive series and set apart as special mouth organs. . . . In the higher crustaceans the

anterior part of the stomach is provided with certain masticatory appendages or stomacholiths, often termed teeth, though more analogous to a sort of a calcareous gizzard. These consist of several calcareous pieces, moved by appropriate muscles inserted in the membraneous wall of the stomach, armed with a smooth medium plate and lateral molar-like organs, whose mimetic resemblance to the molar teeth of some forms of mammalia affords a beautiful illustration of the way, through the selective influence of similar functions, analogous structures may be built up in organs which have no homology whatever. Two smaller points, bicuspid in the lobster, tricuspid in the crab, complete the carcareous apparatus.

"Among the schinoderms, the sea-urchin has a remarkable apparatus called "Aristotle's Lantern," which contains what may be fairly regarded as true teeth. . . . It is very complicated in its arrangement, but in essentials consists of five hard, calcareous wedge-shaped sockets or alveoli, each containing one porcelainous chisel-shaped tooth. The teeth are, like those of rodents, usually worn more on the inner than on the outer side, and therefore in wearing always preserve a sharp edge. The combination of the teeth and alveoli produces a pentagonal cone, the apex being formed by the coming together of the points of the teeth. In life this cone is concealed within the tissues, only the points of the teeth projecting."

Not many of the Mollusca are provided with teeth; the entire group of Acephala (the headless molluscs, such as clams, oysters, mussles, etc., are entirely without head or dental apparatus. And not every one of the Cephalopoda (whelks, snails, periwinkles, etc.,) are provided with teeth, but most of them have such organs. When they are found they are arranged on the "*odontophore*," a chitinous band upon which the teeth are set, pointing upward and backward like the papilla on a cat's tongue, and it grows out of the radular sac in the floor of the gullet. The floor of the sac is carried forward, with the radula upon it over an arched, cartilaginous mass called the buccal cartilage, and down to the front edge, immediately behind the mouth. This serves as an elastic pad which may press the denticulated surface of the radula against any object to be torn or cut. This is controlled by muscles which draw it backward and forward, or even protrude it, as can be seen in the common wood snail, in which the pink buccal mass is pushed forward to seize and cut food. In the snail the number of these teeth is remarkable, 12,000, to 40,000 have been counted on the saw-like lingual ribbon. It can cut grass or leaves sharply off. As the teeth are worn off the ribbon, it is uncoiled, and new teeth are thus brought into use. The upper part of the mouth is lined with a horny substance, against which the sharp-toothed tongue works with a rasp-like motion. The tough leaves of the lily may often be found cut by the snail's lingual ribbon.

"The teeth on the strap-like odontophore are varied and remarkable in shape and size, and are difficult to examine, as some of them are very minute and hard to dissect out and study. They are usually composed of a base, a shank or stem, and a cutting edge, the latter simple or variously denticulated. The form of the cutting edge is varied, the carnivorous forms usually having simpler and more claw-shaped teeth. When arranged in rows, as they are in many forms,—the middle row is called the median or *rachidiæn*, teeth, and the lateral rows, the lateral or *pleural* teeth. The latter are usually right and left.

Sometimes there are teeth outside of the lateral rows which are called the *Uncini*, and are flat, plate-like, or slender, spiny teeth. They may be very numerous, as in the vegetable feeding snails, or wholly absent in other forms."

There is much to be observed about the teeth of the snails and their allies, and the field offers a profitable opening for investigation. They are already divided into classes by an elaborate system of arrangement, but much remains to be done in describing varieties. "The adult perfect teeth vary from nearly transparent to an amber yellow or reddish brown, and sometimes the cutting points are black. In any large whelk they are easily seen, and in a large cuttle fish the radula may be an inch wide. On the other hand, in some small land snails, where the whole shell is not larger than a pin-head, high powers are necessary to observe them. . . . The highest type in the system of classification is called the *Toxoglossal*, or arrow-toothed, from their narrow, round form, often barbed, and sometimes hollow to inject poison—as in *Belaor Conus*.

Next come *Rachiglossa*, having only rachidian teeth, as in the common whelk. The teeth are usually slight and varied, and prettily denticulated on the cutting edge. The next is the *Tænioglossa*, bent-toothed, including the greater part of the fresh water snails. The *Ptenoglossa*, feather-toothed, are a small group, of which the sealaria is a member. The *Rhiphidoglossa*, needle-toothed, comprise a large number of sea-snails, and a few operculated land snails. The last is *Docoglossa*, chevron-toothed, and includes the limpets. Some snails present a pavement-like form and arrangement of teeth, which are often of a very pretty pattern, or again a mere hardened mass.

We have thus given briefly the outlines of a study of the teeth of invertebrates, merely to indicate the extent of the subject, and to suggest the interest and attractiveness there is in its pursuit to the naturalist; and in addition to this, to suggest that the study of invertebrate odontology has a positive value to the comparative dental

anatomist, from a philosophical standpoint. As a leaf from the great book of Nature, it unfolds to us many of her beauties and wonders, and it is also pregnant with suggestions to the dental student who follows his subject out into all of its branches. So we find in this branch, varieties of form and adaptation to purposes which are not paralleled in the vertebrates. The study of their forms and fitness to perform particular duties, is full of interest and surprises, in the fertillty of design which Nature exhibits. Then the analogies presented are very interesting, as in the case of the cuspidate teeth of the stomacholiths of the crustacea, which resemble vertebrate grinding teeth, and show that similarity of function often develops similarity of form, even in dissimilar parts. Of homologies with vertebrate teeth, there are few, as the jaws of the articulates work horizontally and those of vertebrates vertically. In the few instances of invertebrates which have vertical jaws, those parts are armed with beaks and the teeth are situated further back on the odontophore. The teeth of the sea-urchin have true sockets and alveoli, but their arrangement, support, and motion are very different from those of the vertebrates. So that taken altogether, the class presents few homologies with vertebrates, or even resemblances to them, and thus affords a variety of illustration that the latter does not supply.

Dr. Talbot: You have all heard Dr. Thompson's paper read by Dr. Marshall. Are there any remarks?

Dr. Whitefield: There is very little I could say on the subject. Last summer I was very much interested in the study, and I have some teeth at home which I think are nearly three-eighths of an inch long and the arrangement is very beautiful. There is a little skeleton-like arrangement something like a trap, coming to a point, and the tooth presses down over that point. They all work separately.

Dr. Rusk: A few days ago, I saw a specimen which I would like to show here, and will bring here some time during the session. It is a very large tooth that was sent here by some chief in the west, and the remarkable part of it is that the enamel is black or almost black. It is a very immense tooth with very short roots. I think it is a very rare specimen.

Dr. Talbot: As the sessions are to be very short and we have to leave the room at half-past five, and as there are a large number of papers, it would seem to be a good plan to have another one this afternoon, so as not to crowd them in the last session; and I would suggest that Dr. Marshall read his paper.

Dr. Andrews: I think it would be better to have Dr. Marshall's paper held over until another meeting. It is an interesting paper and there will be more members present.

Dr. Talbot: What is your pleasure in regard to the matter? I would suggest adjournment.

Dr. Marshall: I move that a nominating committee of three be appointed, to nominate officers and report to-morrow afternoon. Seconded and passed nnanimously.

Dr. Talbot: I appoint Dr. Marshall, Dr. Taft and Dr. Williams. The motion to adjourn is now in order. Seconded and passed.

WEDNESDAY, MAY 6.

The meeting having come to order, Dr. Talbot occupied the chair.

Dr. Talbot: The first order of business this afternoon will be the election of officers. According to the Constitution and By-laws, officers are to be elected the "second day of each annual meeting." I believe a committee was appointed to attend to the matter, and as this is the time for that order, we shall have to take it up at this hour. Have the nominating committee any report to make?

Dr. Marshall: Mr. President, the committee has not been able to get together yet, but we will make a report after the discussion closes.

Dr. Talbot: If there are no other committees ready to report, the next order of business will be papers from Dr. Geo. S. Allen and Dr. E. Andrews.

(Dr. Allen here read his paper, after which he illustrated the same by stereopticon views.)

THE GENESIS OF THE CONTOUR FILLING.

BY GEO. S. ALLEN, D.D.S.,
OF NEW YORK, N. Y.

So generally accepted is it by the profession at large that the contour filling represents the highest development of the art in conservative dentistry, that it is as much as a man's reputation is worth, to say a good word for the old-fashioned face filling of years gone by. Practice and precept, it is true, do not always follow the same road; still it is a healthy sign of growth to see the highest ideal kept well in the foreground in all our discussions and writings. No subject has been so well and so ably handled by the wise men in our profession, as the one that presses the claims and advantages of contour work. So true is this that he who would start on the hunt for one single brand new thought or idea on the subject, would have a weary road to travel and have little to show for his time and trouble when he came to foot up his returns.

At the best he could only hope to attract attention by giving some more beautiful or apt illustration to some well-worn idea or principle that had already become the common property of all. So I turn aside from this uninviting field of labor to another—one more practical, and I hope therefore more interesting, and will confine my thoughts

entirely within the lines marked out by the title of my paper: The Genesis of the Contour Filling, or how it is made. And this I do for the further reason that so far as I know the cardinal rules to be kept in mind in this kind of work have never been presented to the profession in short compass.

Even within these lines I doubt much whether I can give you much that is new. Still, I think a little less attention has been given to practical instruction in building up the contour filling, than to preaching about its many advantages and beauties. This close attention to one thought will also preclude entering into any discussion as to when and where to attempt the full restoration in the shape of the tooth under treatment. Individual judgment largely controls practice in all cases, and the wise dentist, like the wise physician, always adopts the elective motto. The wisest short law I have ever seen pertaining to this point, came to me in a private letter from an acknowledged authority on the subject, and sums as follows:

"To understand me more completely, I would state that I have not for a considerable time been in favor of inserting very large gold fillings in this manner, and for the reasons you have given in your paper, that the structure and elements of the tooth are not such as to promise a durable retention of the mass of gold, by the weakened tooth. But for medium-sized and small cavities, I am equally convinced from long experience and observation of my own, and the work of others, that no other method offers the same degree of permanency or usefulness."

By so doing he placed himself in the position of the philosopher who said he always obtained what he wished for, and added, sotto voice, "I take good care never to wish for what I cannot obtain."

Taking up then, the building or making of a contour filling, a threefold division of the subject naturally presents itself:

1. The preparing of the cavity. 2. The placing therein of the filling material, and, 3. Finishing and polishing the completed work.

Now a good deal that may be said about the preparing of the cavity will apply to the simpler and easier operations of face and crown fillings; but this one wide difference must be constantly kept in mind, viz: as the size of the cavity increases, the difficulties and dangers increase, not proportionately, but in a geometrical ratio, and therefore a relatively greater care and attention must be given to all the details of the longer and more complex operation. A few quick sharp cuts will suffice for preparing a simple crown cavity, but they would fall far short of filling the bill in any case that we propose to consider this evening.

As the architect or engineer sees his completed work, before the actual is even started, so should the dentist be able to discern the full size, shape and figure of his proposed restoration, and each step should be so carefully planned and made to fit the next, that in the completed whole, nothing may be wanting.

Very much of success depends on bearing this safe rule in mind. In fact, it is difficult to conceive how one can plan wisely unless he does. On the size and shape of the cavity, on the proper distribution of retaining undercuts or pits, so as to protect and strengthen weak walls and throw the burden on strong ones, much good judgment can be placed, and the writer is convinced that just here may be found the cause of many failures. Undercuts are made too deep, and retaining pits made in such positions or manner as to either weaken the tooth or endanger the pulp. Deep undercuts, though they make operations easier, are seldom called for, and endanger the completed work, and they do this in two ways: 1st. By weakening the walls of the cavity, and 2d. By making real obstacles to forming a homogeneous, well-packed filling.

The deep undercut, though it holds the great bulk of the gold in place, is itself difficult to fill. To do so well, takes much time and care, and the use of exceedingly small pluggers, and this they may not receive. Where all the walls of a cavity are standing, and the face of the tooth adjacent to the cavity is perfect, the walls of the cavity should be left as nearly parallel as possible, and no pits of any kind made. In fact, nearly parallel walls should be the rule, and pits always avoided, when possible.

The real study and judgment is called for in those cases where the natural face or faces of the tooth have been lost, either by decay, or the too free use of the file and chisel, for, as will be referred to a little later on, in speaking of packing the gold, a point of considerable interest and value arises in these cases, as to whether the filling should be allowed to overlap the walls of the cavity, and simply lie against the face of the tooth on the outside, or shall be made continuous with the walls of the cavity, and bulge only from the cavity itself.

Believing fully as I do that overlapping gold is gold in a dangerous position, I would strongly advocate such a preparation of the cavity as will minimize this danger, even if by so doing, the full realization of our ideal in contouring be not carried out.

It is a sort of belief with many, that in all cases, the packing of gold should be commenced at the cervical wall or base of the cavity. This is a mistake. Oftentimes more certain and rapid work can be done by starting the filling back in the grinding surface, and building downwards. And so this point should be considered, and the cavity shaped accordingly.

As the enamel forms the edges of most large cavities, its proper management is a point of interest. Long ago I advocated in a paper read before the New York Odontological Society, the complete removal of the thin edge of the enamel often found at the neck of the tooth, and this I did for the double reason that it was only slightly adherent to the dentine just there, and so liable to split off during the operation of filling, and secondly, it was very difficult to make a smooth edge on it.

Since that date, I have seen no reason to alter my judgment in respect to this method of practice, but have had many confirmatory ones brought to my notice. Leaving the thin edge leaves a weak spot, and that is bad.

A final point to observe in shaping the cavity, consists in making the edges smooth and polished, and just here the great advantage of the dental engine, with its rapidly revolving bur, comes to the front. No hand instrument, no matter how much care is used, can compete with it. A sharp, well-cut bur will do in a few minutes, far more effective and perfect work, than the sharpest hand instrument can, in a far longer time. If, in addition to the bur, the edges are polished with the wood point armed with powder, or still better, with an uncut round soft iron point, armed with diamond dust, perfect edges can be quickly obtained.

We come now to what many will think the most important part of the work, and the one in connection with which probably more science and skill can be employed than in any other. Two great essentials are to be here considered: The perfect adaptation of the gold to all the walls of the cavity, and the accomplishing this with a minimum amount of force, and a third may be added; that the filling may be made homogeneous and solid throughout.

Imperfect adaptation makes failure almost a certainty, and undue force (and by this I mean any amount of force over and above that required to condense the gold), is almost equally fatal in the end. How then, first of all, shall we proceed to make the gold fit the cavity?

The quality in gold that we make use of in building up a filling of this character, viz: its welding property when pure and freshly annealed, is not one that can be trifled with. It is our servant if we handle it rightly, our master, if we slight it in any particular.

In skillful hands, pure gold is almost as pliable and obedient to the touch, as the clay the sculptor uses to fashion the child of his fancy, but there is this difference: the clay can be worked over and over again, a little added here and as much taken off there, and so long as it is kept moist, it responds to the brain back of it; but not so with gold. Place a bit in position in such a manner as to ensure perfect contact with that already in place, and the union will be perfect, and it becomes a part of it; but you cannot try a second time; the first is the only one that will be allowed you; if it does not take its proper position at once, you may be sure that something is wrong, and you cannot make that wrong right by using extra force. The moment that is done, the evil that resides in the metal, and that heretofore had been dormant, manifests itself. It becomes stubborn, brittle and cranky, and will not do anything you want it to do, but will persist in doing everything you most object to; like some individuals it has a dual nature, and we must beware how we call out the perverse side.

Then again the amount of force used must always be proportionate to the size of the pledget to be packed, and exactly, too; not enough force fails to insure solidity, and too much has a tendency to bring out the harsh qualities alluded to. As the pledget must be packed in the exact position in which it is first placed, and cannot be moved from it, great care and good judgment are required to avoid pits, and to make certain that the surface is kept even, for it is much more difficult to fill a pit or sharp depression, than to continue a flat surface; and the permitting of pits near the walls of the cavity is especially to be avoided, for the extra force necessary to fill them, too often weakens the walls or even crumbles the enamel. So the rule to be observed is to, as far as possible, carry a uniform surface upwards, and as the filling grows keep the marginal portions a little in advance of the centre.

Another advantage that results from this plan of procedure, is that it makes more rapid work possible, in that you can use larger points. A pit or depression near the walls necessitates the employment of small points, for the point in use must always be a trifle smaller than the pit to be filled. This suggestion is by no means an unimportant one, and a little thought will soon convince one of that fact. The correct packing of gold is in truth an art of itself, and requires an educated touch, and correct eye.

The celebrated painter, Meissonier, always took the greatest care of his hands, keeping them scrupulously clean, and even tender, by the constant use of gloves. He said that a painter's touch must be most sensitive and delicate. So it should be with the dentist, and he ought to be just as careful and particular. Long finger nails, or callous finger tips are to be avoided.

Where to start a filling is a matter of some moment. It is generally commenced at the cervical wall, but cases frequently occur where the commencement may be made with advantage back on the grinding face of the tooth, and the filling carried backward or forward to the floor of the cavity. An advantage frequently arises from this method, for by carrying the gold along the sides of the cavity towards the bottom, any movement of the gold is avoided, and pits to ac-

complish this same purpose are not required. Anyone who has not tried this plan will be astonished to find how frequently it facilitates the operation. Deep pits in the writer's opinion are great nuisances, and are only admissible when other means fail to accomplish their purpose.

What has been said regarding the manner of making a filling, leads naturally to a consideration of the points to be used, their shape and the best methods of applying the force necessary for condensation of the gold. If the gold is to be built up layer by layer, in a series of plains, the thought naturally suggests itself, that the shape of the points should conform to that of the plains themselves, in fact, should have flat surfaces, and this will be found to be a correct statement. The late Dr. Varney was the first to incorporate this principle in a series of pluggers especially intended for packing cohesive gold, and the set made from patterns furnished by him, to this day stand unequalled for their especial adaptation for contour work. The points all have plain surfaces, and are very finely and evenly serrated. Slight modifications only have been made in them since his day, so completely did he work out his theory in steel.

A round point may have some limited utility at times, but never can be relied upon to any extent. It would be a matter of the greatest difficulty to make a large, uniformly-packed filling by their use only. Deep serrations are faulty in that they cut the gold and require extra power to force the gold into a solid.

How to apply the requisite pressure is now to be considered, and possibly it is the most important consideration of all—how to apply just enough force for the purpose, and to apply it quickly, uniformly and evenly; how to apply the "quantum sufficit" and no more, and in a manner to give your patient the least discomfort, and lighten the labor of the dentist, is a serious problem.

I take it that few would seriously consider hand-pressure alone as offering the best solution. Let alone its being the most laborious and tedious method, it rarely produces perfect work. We cannot get along without it, especially in commencing operations; but good judgment and good work alike demand that it be supplemented by some means more under control, more direct in its action and developing more power; and this can only be done by resorting to some one or more of the various devices which the ingenuity and thought of the profession has placed in our hands the utilizing the power of momentum, or, in plainer terms, the mallet.

The late Dr. Atkinson, whose memory we hold in respect, and whose loss we deplore, was probably the first to suggest this means of obtaining the desired end, and in his hands, and in the hands of his followers, the hand mallet was made to do most excellent service; but it was soon found that it offered only a partial solution of the problem: to mallet for oneself, was awkward and oftentimes impracticable, and the impossibility of making two brains work in harmony, made the assistant malleter as often a nuisance, as a help; and careful operators soon gave it up, as being impracticable. The automatic mallet, in some of its various forms, took its place, and so well did it do its work, that it will probably always hold its own, and retain a well-deserved place in the dentist outfit. Then followed the electric mallet, a step in advance and a big one; but it had many inherent defects, that greatly impeded its general adoption.

To-day, the mechanical mallet is slowly but surely coming to the front, and the writer feels certain that the day is not far distant, when it, in some of its modifications, will supercede all others, and for reasons that will now be stated as clearly as possible.

Let it be premised that the more closely the force required can be made to simulate hand-pressure, the better it will be in all ways, safer for the tooth and easier for the patient to bear. Now this is just what the mechanical mallet does, in truth, it is pressure intermittently applied, and in no wise is to be likened to the hammer-like blow that is given either by the hand mallet, the automatic, or the electric.

Take a look at the mechanical mallet in operation, and notice how it works. You will see that the point is placed in contact with the gold and gently pushed forward. This throws the further end of the mandril holding the point back, so that the lug or rounded bit of steel with which the rapidly revolving wheel is armed comes in contact with it and it is pushed forward, and this is repeated with every revolution of the wheel, so that from 1,000 to 3,000 impulses may be given to the point every minute, the direction, number and power of these impulses being perfectly under the control of the operator.

In the mallet I employ, which is the Bonwell mallet, as modified by Dr. S. Perry and Mr. Weber, there are 80 threads to the inch in the adjusting screw, and 40 notches in the collar, so that a movement of the collar one notch brings the plugger mandril $\frac{1}{3200}$ of an inch, or the thickness of the diameter of a human blood corpuscle, nearer to or farther away from the revolving wheel; and yet, small as the distance is, it is distinctly appreciable to the operator and the patient alike. Does it not look reasonable that a forward push movement of the point, through these small distances, must be comparatively safe and can be made to expend itself in the packing of the gold, and the packing only?

A valuable point I have observed is that where the serrations of the point are rightly made, that is, having one side longer than the other, the

point travels over the surface of the filling and has simply to be guided by the operator, so that if placed near the centre of the filling, it will move over the face of the gold in just the direction and manner required. Thus it becomes the easiest thing in the world to pack towards the walls of the cavity. The gold is plastered in position, as it were, easily and rapidly.

The kind and quality of the push can be regulated in several ways other than by the adjustment collar; by increasing or diminishing the speed of the motor, a great change is at once perceptible; and, again, the educated touch will hold the point against the gold so as to ensure perfect packing, and no force wasted. In fact, through a wide variation of power, it is under perfect control.

A few words in closing, on the finishing. This is a matter of detail, and often of sad neglect. Too high a polish cannot be given to the perfected work. Do the best we can, and we will fall short, far short, of Nature's model. Time and labor cannot be thrown away, if intelligently employed in the finish.

I mentioned in speaking of packing gold, that solidity and homogenity were essential considerations. I grant that a filling that is hard enough to resist pressure, and is perfectly adapted to the walls of the cavity, will prove effective; but perfect adaptation and the requisite hardness, as a rule, also mean homogenity, not always though; yet I feel certain of my position, when I say that it is not only far easier to finish a uniformly dense filling, but that the work can be done in a shorter time, and always in a more satisfactory manner. I know of no more discouraging labor than that employed in attempting to put a finished surface on an imperfectly packed filling.

Where a tooth has been mutilated by disease, or the file and disc, a question often arises, as before mentioned, as to whether the gold shall be allowed to overlap the edges of the cavity, or simply be rounded out from them. It is doubtful whether gold can be made to lay against tooth substance in such a manner as to prevent the ingress of fluids. The thinner and deeper, or thinner and wider the overlapping gold, the greater the doubt and uncertainty. If the diameter of the gold is one-third or one-half greater than that of the cavity, we may be almost certain of trouble in the near future.

The difficulty in making a perfect edge is also greatly increased in these cases, and so it is a safe rule to observe to finish the gold to fit the cavity, and to take the place of an overlapping lid as little as possible.

In shaping, the articulation should be left always in such a condition that the filling should, in mastication, be pressed back into the tooth, not out from the cavity.

As a means of education, I know of nothing superior to making fillings out of the mouth. Anyone who has not tried it will be surprised at the amount of instruction that can be acquired in this way, and in no other. Any earnest worker who makes the experiment will be astonished to find not only that the operation is not easy, under these simple conditions, but as he aims for perfection, how difficult it is to attain. His edges will remain imperfect, and his powders will scratch, and he will wonder how he ever succeeds in the mouth.

To sum up, in preparing your cavity be careful to avoid deep undercuts or pits, and throw as little strain on the enamel as possible, and make clean, polished edges. In packing the gold, bear in mind that your filling must be homogeneous throughout, perfectly fill the cavity and built up in a series of plains, and in finishing imitate Nature in the high polish you put upon your work, for at your best will you fall far short of her beautiful handiwork. To do perfect contour work requires care and skill and a conscientious regard for all details. With practice and experience one will be surprised to find how often the impossible becomes possible, and the difficult easy of attainment.

Dr. Taft: Mr. Chairman, the paper just read is a very good one. It contains points that ought to be regarded and utilized in the treatment or management of the borders of cavities, and especially proximate cavities, which is one of the most important particulars in the matter of filling. It strikes me that in all instances, the operator should be guided by the kind of material or tissue he is working upon, or rather the character of the material. Some teeth are of such good structure, that treatment for the arrest of decay is more easy and simple than in others. The importance of thoroughly studying the character of the tissue upon which the dentist expends most of his operative skill should always be kept in mind; to know just what he is working upon—whether strong, firm teeth, or those of poor, soft structure. It requires very delicate manipulation to secure the best results. I think this is one of the most important points, and a point that is much overlooked by many operators.

Another point that was emphasized, and justly so, was the perfection of finish which ought to be put on the border of every such cavity. It should be polished or dressed with diamond dust, or anything else that will make a perfect finish. Another point is, the overlapping of gold. We all know there is a great deal of faulty work done in this direction; gold overlapping that ought to be cut away. I think that there should be no more overlapping than there has been cutting of the enamel or dentine. In no instance should gold be permitted to overlap the normal or uncut surface of the teeth.

Another point is the uniform condensation of gold in the cavity. Now we may say it is not of great importance, but it is, for if the gold condensed is defective or imperfectly consolidated, there is always room for mischief. It should be a matter of study, then, to secure the most uniform condensation, the most perfect adaptation, the most uniform condensation of the gold throughout the cavity. Great skill is required, and delicate and intelligent manipulations, to secure good results. As to the welding, skilful manipulation is required; the material used must be in good condition, if gold, it must be properly annealed. Any mistake in annealing is fatal. The gold must be free from foreign substance, and it should be pure, and it must be condensed with proper instruments. I believe that nine-tenths of the instruments used are not as they should be. Those only who have manipulated a great deal can tell you how to do it; that is only attained by experience. It is a process that is difficult to definitely explain. The most direct pressure that can be made on the surface is best; if an oblique blow is given, you will very likely destroy the surface for receiving the gold; the best results are attained by as direct pressure as possible. The paper is full of good suggestions.

Dr. Talbot: Any further remarks? Then Dr. Allen closes the discussion.

Dr. Allen: I wish there was a little more discussion on this subject. I always like putting in contour fillings. I think there is as much conscience required as skill; and no man can do good work unless he puts his conscience into it. I am very glad to have my old friend, Dr. Taft, so kindly bring forward many of the points in my paper, and I appreciate it. I will only draw attention now to one point in my paper, to see if I cannot bring out some more discussion about it; because it is a point about which I have thought a great deal, and I hope with good results to myself. It refers to the face of the teeth. The question I want discussed, and I have not seen any writing about it to any extent, is this question of whether gold ought to be built up overlapping the cavity, or rather the gold shall bulge over the cavity, and be finished off. I take the position, and believe that it is one that is substantiated both in practice and in theory, that the building up of the gold overlapping filling, simply lying against the face of the tube, is a great error. Gold in a plastic condition, if overhammered becomes springy, and does not take position against the face of the tube that you can work with certainty as being a perfect joint. In contour filling, you hammer it against the side of the cavity, there is unequal pressure brought in pressing it in place, and the gold loses its soft character and becomes springy; and the more you hammer it, the more the springy qualities of the gold are brought out, and it will work away from the side of the tube, and not lie uniformly and flatly against it. That point is one I would like very much to hear some discussion about, as to the advisability of allowing the gold to overlap the edges of the cavity to any extent, and if any, to what extent. I thank you very much for your kindness in hearing my paper, and for the favorable reception of it.

Dr. Talbot: We will now hear Dr. Andrews' paper on the "Growth of the Cementum."

GROWTH OF THE CEMENTUM.

BY R. R. ANDREWS, M.D.,
OF CAMBRIDGE, MASS.

In the year 1858 Magitot, a French histologist, claims to have found within the follicle of a developing tooth a special organ for the development of the cementum. In 1861 Robin and Magitot made a presentation of the same facts anew. With the exception of these authors, I am not aware that any other authority has recognized the presence of this special organ; while such men as Kolliker, Waldyer, Herz and others have formerly denied its existence. In my own investigations I have not been able to trace it with certainty, although there are appearances in a fully formed follicle of a tissue under the calcifying dentine germ between it and the outer covering of the sacculus that might admit of the supposition of the existence of such an organ. I have noticed this appearance in sections from embryos from the pig and the calf. At a later stage, where the crown is further developed, there is also to be seen infoldings of the tissue at the base of the germ, that may develop into an organ for the growth of the cementum, as stated by Magitot. But in teeth more matured, where the cementum has already commenced its growth, I cannot trace even the outline of a special organ, although I do not consider my investigations to have been extensive enough to warrant me in denying its existence altogether.

Wedl, whose description of the development of the dentine and the enamel is so minute, has but little to say about the development of the cementum. He tells us that, at the margin of the crown, the dental sacculus contracts, and upon its inner surface the formation of the cement is affected, increasing gradually as the formation of the root advances. The lower segment of the dental sac becomes, therefore, the root membrane of the tooth. He believes, with Tomes that Nasmyth's membrane belongs to the cement. Again, he states that the dentine and cement are connected together by means of a layer composed of an agglomeration of transparent globules of varying degrees of thickness. The spaces intervening between the latter (interglobular spaces) are irregularly notched and frequently in very close proximity to one another.

He considers that the cement commences outside of this layer, but some of my own sections show it as a dividing line. In describing the methods in which hypertrophy of the cement is formed, he speaks of the various sizes of the corpuscles which form it, stating that many of them have a glistening appearance. Smaller corpuscles are sometimes attached to the sides of larger ones, or are blended with them. Large and small ones also occur separately. These so-called corpuscles are, I believe, globules of calco-globulin, forming by merging into others a layer of calco-globulin, that shall form the matrix of the hypertrophied cement.

Tomes tells us that is difficult to point out any distinguishing structural character between primary bone and that of the cementum. The cells close to the surface of the forming cementum, which were formerly called osteal cells, have now been named osteoblasts. No bone is formed until after the appearance of this osteoblast tissue, and Rollet believes that these osteoblasts are essentially a new growth; they are so distinctly marked off that it almost assumes the character of an epithelium. If we harden a partially-formed tooth in chromic acid, and subsequently decalcify and cut it transversely through the root we meet with the following structures from without inwards. On the outside is the outer part of the sacculus, now the periosteum. Internal to this is a layer to which the name cambium has been given, consisting of roundish cells with processes. These lie in a reticulum made up of cells which give out a small number of homogeneous transparent processes. By the inosculation of these processes a net-work is formed. Between this net-work and the fully-formed cementum lies the osteoblast layer, consisting of much larger cells. As the osteoblasts form a continuous layer and are very numerous it is obvious that only a small percentage of them ever form lacunæ or bone cells, or otherwise retain their individuality. As the process of calcification goes on the outlines of individual cells become lost in the general transparency of the matrix, only a cell here and there remaining as a lacuna. Again, he states that contiguous osteoblasts become fused together by their exteriors, so that their individuality is lost.

Prof. James Tyson, in 1873, writes: Some difference of opinion existed as to the exact tissue which undergoes conversion into cementum, some alleging that it results from ossification of the tooth sac, while others, among whom are Kolliker and Beale, believe it to originate in a soft stellate tissue, made up of branching and communicating cells, which are found upon the surface of roots of teeth, and within the tooth-sac. This tissue undergoes calcification, spherules of lime being deposited, which gradually fuse and form a transparent, intercellular substance. In this process not all the cells of the stellate tissue become lacuna of the cementum, but some are obliterated by the deposit, and there are therefore fewer lacunæ in the resulting cementum than in the previous stellate tissue, while the canaliculi are much more numerous than the prolongation of the stellate cells, many of the lacunæ having thirty or forty prolongations, while the stellate cells rarely have more than from ten to twelve. The cementum is more slowly formed than bone, and a more permanent, but probably less perfect tissue; its matrix is harder and more transparent, in this respect approaching the dentine.

Klein tells us that the tissue of the tooth-sac represents the matrix from which the cement is formed; its structure and function are that of the osteo-genetic layer of the periosteum, and that the formation of the cement out of that tissue is identical with sub-periostical bone.

My investigations show that if we examine the developing tooth, just after the cementum has commenced to form, we shall find that the matrix of the cementum is made up of masses or layers of that tissue, which we find everywhere on the borderland of calcification, between the organic and inorganic substance. This is a tissue which Tomes has said was produced solely by the destructive action of weak acids, but that his conclusions are erroneous is proven by the fact that this tissue appears in sections where no acid has been used. It is a tissue formed by the coalescing of minute, globular bodies, calco spherites, into globules and layers of a tissue that is called calco-globulin. The minute globules, in forming the matrix of cementum, seem to come from the osteoblasts and form the calco globulin layer in somewhat the same manner as I have described and pictured in the developing dentine. The smaller globules, by merging into each other, form larger ones. They have a glistening appearance, like fat cells, are about the size of the osteoblasts, but are not cells, though often taken for them. They have no membrane and are without a nucleus. They are the bodies which Tomes and others say become fused together by their exteriors. Outside of the layer formed by the globules, the developing matrix of the cementum, we see a row of cells, which Rollet stated looked like an epithelium. They are the osteoblasts or cementoblasts, and the granules that have been described in their substance are very minute calco spherites, which the cells give out to the forming matrix. Tomes has called them osteal cells. They are the same in appearance as those we see around the edge of the developing bone of the jaw. Just exterior to these cells we find roundish, nucleated cells with innumerable processes, reminding one somewhat of a stellate reticulum, only that the stellate character is not so marked. Just outside these we find the connective tissue which is really the perios-

teum. If there exists at this time a special cement organ, it must be formed by this slight amount of stellate tissue which is between the periosteum and the layer of osteoblasts that are against the forming cementum. In preparing my tissue, so as to have it as near life as possible, I made use of the same methods as were described in my papers on the development of the dentine and of the enamel, and I find that the osteoblasts, which are said to be full of a peculiar granular substance, are, when the tissue has been properly prepared, found to be filled with minute spherical bodies, which have a glistening appearance. Across the developing matrix of the cement are found numerous fibres, probably connective tissue fibres, that are also found in developing bone. They were seen and described by Sharpey and are named after him, Sharpey's fibres. They become calcified within the matrix. As the cementum grows thicker we find that the developing matrix is infolding in its substance large nucleated bodies which appear to be connective tissue corpuscles. They are somewhat larger than the osteoblasts and are forming the cement cells, or lacunæ. They have a higher function than the osteoblasts, that is, they are to give nourishment to the matrix, being connected with others by means of canals or processes, of which there are many, some of which run in the direction of the termination of the dentinal tubes, as though connected with them. When enclosed by the developing matrix of the cement, minute, glistening, globular bodies are seen within their outline, or membrane; indeed, it appears as though these minute globules were deposited on the periphery of the cell by the cell itself and here fusing give the cell its peculiar characteristic shape, which is not as regular as that in bone, and is oftentimes very much larger. Their processes, probably anastomose, with the dentinal tubules through the inter-globular spaces of the so-called granular layer, although I have never been able to trace them. I look upon the granular layer itself as a condition caused by an arrest of the developmental process, while the first layers of dentine were being formed. It has its existence solely from the fact that in the first forming layer of dentine the globules of calco-globulin which form its matrix did not fuse together. It is exactly identical to the inter-globular spaces found in the crown. The point that I would emphasize in this paper is that the matrix of the cementum is formed from a secretion of the osteoblasts, and this secretion is a multitude of minute globular bodies, given out against the dentine. In a work entitled "General Biology," written by Profs. Sedgwick and Wilson, they make a statement that the matrix of a tissue is composed of lifeless matter which has been manufactured and deposited by the living protoplasm constituting the bodies of the cells; and, again, cells may manufacture a lifeless substance which appears in the form of solid partition walls between the cells, or as a matrix solid or liquid in which the cells lie; and, again, the cells are small masses of living matter or protoplasm which deposit more or less lifeless matter either around (outside) them or within their substance. The lifeless matter which is given out by the osteoblasts to form the matrix of the cementum is in the form of these minute globules, and these fusing together form larger ones, which merging form layers of an uncalcified substance that Prof. Harting has named calco-globulin; this is by further calcification to become the calcified matrix. In speaking of the formation of exostosis, Tomes states that at the junction with the root he finds a substance that is dense. It is torn with difficulty, and nnder pressure slips about between the two glasses. It is gelatinous, osseous matter, and with it may be seen rounded, amorphous molecules. This is a good description of calco-globulin. Tomes says that the cementum is not developed by a direct metamorphosis of the periosteum, but by the calcification of a new growth. Cells are produced, the individuality of which becomes lost in the process of calcification; the interior of the cells seems stuffed with an opaque and dense substance disposed in large granules, among which the nuclei cannot positively be pointed out. The large granules within the cells are really calco-spherites and careful preparation of the tissue will clearly show them. The merging together of these globules forms a layer and this calcifying, layer after layer, gives to the cement the peculiar laminated appearance that is so often seen. It is by no means difficult to trace evidences of this globular formation in the cementum of fully formed teeth; indeed, I have several sections of human teeth that show the outlines very clearly—so clearly in fact that one might call it the interglobular spaces of the cement, probably caused from some arrest in the full development of the tissues.

Dr. Marshall: Mr. Chairman, as I feel I shall be obliged to absent myself, I wish to make a report from the nominating committee, for Chairman of the Section, Dr. Taft, of Cincinnati; and for Secretary, Dr. E. S. Talbot, of Chicago.

Dr. Taft: I would rather that some one else would accept. I do not absolutely decline, but think some one else can hold the position better.

Dr. Talbot: I think it will be necessary for the committee to confer with each other still further, and while they are conferring, we can hear a discussion on the paper.

Dr. Andrews: I understand it is necessary to vacate this room at 5:30.

Dr. Talbot: We have ascertained that is not the case. So we can discuss this paper.

Dr. Taft: I want to make a remark in refer-

ence to this matter. Dr. Andrews referred to what are ordinarily termed globular spaces, and gives the location as between the enamel and dentine.

Dr. Andrews: Not between the enamel and dentine—just within the dentine.

Dr. Taft: I know; I understood you to say this position has been taken by others, that they located the inter-globular spaces in this granular layer, but that is not the location nor the appearance as originally described by Czernack, as recorded by Kölliker. If the structure denominated inter-globular spaces is to be found in the granular layer, then what is this globular structure within the dentine?

Dr. Andrews: The one is like the other, with this difference: the calcified globules near the cementum are small, while in the dentine of the crown they are much larger.

Dr. Taft: We have not ordinarily applied the term inter-globular space to this layer between the enamel and dentine. In some instances there is a very large mass of it, of considerable thickness. Another peculiarity of that layer is, it seems to consist, whether of thick or thin, of mere little globular granules. In some instances there seems to be tubuli, or something of the kind, extending through it to a very considerable extent. I wish I knew more about that than I do, and about the inter-globular spaces.

Dr. Andrews: Inter-globular spaces are found with the globules, in layers, the layers of formation, some near the enamel, others nearer the pulp. In the teeth of some fishes, the whole matrix is globular. In the human tooth, it is an evidence of lack of nourishment while the tooth is forming. The globules do not fuse, they are arrested and calcified as globules, not forming a perfect layer of matrix. The substance between the globules is not a calcified substance. Some teeth have very little, some have no evidence of a granular layer, so-called, others have a good deal. Some have hardly a trace of what we call inter-globular spaces in the dentine of the crown, others will have a large amount. It is an arrest in the developmental process in the formation of the tooth while it is forming a layer of matrix. For some reason, the globules have become calcified while in the globular form, before they have fused together. The tissue of inter-globular space is not fully calcified, while the globules always are.

Dr. Allen: This theory of Dr. Andrews', which I believe he does not stand alone in, is one that I think we should place in the status that the old Scotch law allowed, when a person was tried, and was neither innocent nor guilty—it was not proven. The three structures of which the two substances are composed, enamel, dentine and cementum, are as diverse in their character and structure as any three tissues well can be. According to this theory of Dr. Andrews, all three of these substances, materials or tissues, that is, the matrix of them, have a like developmental basis.

Dr. Andrews: The lime base of the matrix material, the basis substance, is the same in all. It is the calcified tissue.

Dr. Allen: All three are formed from cells, which have special duties required of them. Enamel is only 2 to 4 per cent. animal basis, 96 to 98 per cent. mineral. Dentine, again, is 30 to 40 per cent. animal, the balance mineral. I have examined a great many of these specimens of Dr. Andrews', and I have endeavored to see exactly as he sees, and I think I do see what he sees; but I don't interpret it as he does, for this reason: The material, whatever it is, the calcoglobulin, is thrown out in the shape of little globules, which vary greatly in size and character. The position may or may not be a vital condition. All these preparations of Dr. Andrews' were made with the greatest care, and from sections as little changed in preparation as possible. The calcification was produced by a very weak solution of acid, and every care taken to change the tissue as little as possible; but—and I hope I may be excused in saying so—it is not proven that these are not post-mortem appearances; and a long series of experiments will have to be carried on to prove whether they are post-mortem or living appearances. You do have unmistakable indications of these globular layers; and they are beautifully shown in these preparations. These appearances are not constant; you see them now, and again you don't.

Dr. Andrews: I have been speaking of the matrix substance, not its animal base; that is another matter. The globules are always present in my specimens.

Dr. Allen: But the main point I wish to show is, that I do not see whether this cannot be, in a measure, post-mortem appearances. I do not see why the fluids that have been used in preparing the tissues, the glycerine in which they are mounted, may not have some cause in giving them their characteristic appearance. It is a most interesting point, whether the two kinds of cells that go to make up the formation of dentine, really exist or do not exist, one the fibre form and the other the matrix forming. We often see appearances that would indicate double or dual nature of the cells that form dentine. In enamel it is not so. We do not often treat, and we seldom see, dual character of cells. To be sure, the enamel is so totally different, that the one form could be dispensed with; but in the sement magann it could not be. There we have a large mass of animal matter, and we have a composite structure, dentine.

Now, so far as these inter-globular spaces are concerned, Dr. Andrews specimens were taken

under high power. The inter-globular spaces in dentine are vastly different in size from those inter-globular spaces that Dr. Andrews threw on the screen. Take a tube and make a section of it, and you will find inter-globular spaces sometimes; I should say they would extend across nearly one-tenth of the thickness of the tube. Those globules are much smaller than the average size of the inter-globular spaces you find in dentine.

Now I am not saying that this theory is not true. I believe that the evidence Dr. Andrews offers is very strong and confirmatory evidence. I only say there are still some points open for investigation before we can say proven and adopted. I don't know of anyone in the profession who deserves greater respect than does Dr. Andrews, or who has done more disinterested work; and the results have been certainly most gratifying. I can say this heartily and truthfully; and I know of no one who has given his specimens more freely and generally to others for the purpose of examining them.

Dr. Taft: I wish more attention was given to the discrimination of these two conditions as just indicated by Dr. Andrews. The large spaces within the dentine that are ordinarily denominated globular spaces are very different in size from any condition that is found in the granular layer. In the granular layer these little spheres are granulous and thoroughly calcified. This peculiar structure, abnormal structure, in dentine marked by these lines in a greater or less degree, is defective structure; and then these circles or segments of circles that is within dentine that is not in a normal condition, occasionally you find deep lines running through that, and in some of them no organization of that kind at all.

The globules are thoroughly calcified. The inter-globular space is not perfect, but the globular spaces are perfect. The tissue between the globules is not calcified, but the space between the globules is soft. I assume this matter is clear to Dr. Andrews, but I wanted him to make it clear for me and for all of us.

Dr. Andrews: If you will examine sections of teeth where there are inter-globular spaces, you will find the globules are calcified. In dried sections, the spaces between the globules will show dark under the microscope, in the same way as the tubes do. It is because the spaces are not calcified, and when dry they fill with air. Some of the globules are only slightly attached to the matrix, while others show only a portion of their contour.

Dr. Allen: Do I understand you to say that this is a secretion?

Dr. Andrews: It is supposed that the line in the form of minute calco-spherites, comes from the blood. These pass through the cells, and are seen to be merging together forming larger globules, or mulberry shaped masses, and these fusing form the perfect layer of matrix, if there is no arrest of development, while they are in this stage.

Dr. Taft: You make the point, it was arrested in development?

Dr. Andrews: Yes, when inter-globular spaces are found.

Dr. Taft: You mean that the environments are not perfect?

Dr. Andrews: Yes sir.

Dr. Marshall: Mr. Chairman, the nominating committee beg leave to report Dr. J. Taft of Cincinnati for Chairman, and Dr. E. S. Talbot for Secretary of the Section.

The report was unanimously adopted.

Here the chairman calls on Dr. Grady to read his paper on "The Use and Abuse of Dental Charity."

DENTAL INFIRMARY PATIENTS: THE USE AND ABUSE OF DENTAL CHARITY.

BY RICHARD GRADY, M.D., D.D.S.,
BALTIMORE, MD.

My object is to call attention to the abuse of dental charity, to illustrate its magnitude, and to protest (as every honest and independent man who wishes well to the profession and its respectability should) against the looseness with which dental colleges dispense their so-called charity—to "condemn the fault and not the actor of it;" for silence would give an indirect connection to practices which are lowering the profession in public estimation in the tendency of dental infirmaries to pauperize the people and to defraud dentists of rightful fees. So, judging of the proprieties and obligations of my position, I place the statements—dental infirmary patients: the use and abuse of dental charity—together, and propose to consider them in connection, because the evidence in regard to them constantly mingles.

You, gentlemen, familiar as you are with recent medical literature, if not appalled at the rapid growth of the dispensary evil, fully realize that it is an evil, that it is taking the means of livelihood from many deserving men, that it is growing, and that it must be combated to be kept within proper bounds.

The sorrows of our cousins across the ocean have been told you in the medical press. "The dispensary abuse in other lands," "the startling excess of medical charity in Edinburg," "the abnormal growth of the out-patient department at Cambridge," "the great and urgent question of hospital reform" in Birmingham where the out-patient of hospitals "have advanced in 20 years—1867 as compared with 1887—from 67,000 to 166,000," etc., have been commented upon. "Al-

most one-half of the people of Edinburgh, Scotland, receive their medical advice gratis. (The population is little over 236,000, and 103,095 dependent on charity for medical advice!) Nor is this all. The number of persons who in any year actually avail themselves of such aid must of necessity be smaller than the total number who would do so were they forced by sickness or accident; and it looks as if more than half the population were in the habit of expecting medical treatment gratis."

"In the city of New York wealthy hospital magnates are teaching the people the lessons that they have already learned in Edinburgh. In New York the amount of free work done in hospitals has increased 90 per cent. in the last decade. In time the hospitals may become as much an enemy to the general practitioner as the dispensary is. A western medical editor, who, last summer, visited some of the hospitals and clinics of the great metropolis, is quoted in the discussion of the question, "Should a poor man study medicine?" as saying: "What was most striking, outrageous as it is, was the great number of well and fashionably dressed, evidently well-to-do people, both male and female, who applied for free treatment. At the ——— on Tuesday, August 12, there were 568 patients, and judging from their appearance we venture to say that three-fourths, at least, of them were abundantly able to pay for private medical service. We have, of course, heard the numerous complaints among the New York physicians on this account, but we were not prepared to witness the spectacle presented there of gayly-attired, semi-aristocratic humanity going in droves, petitioning for free prescriptions, free medicines. The profession in New York would be justified (he says) in arising in emphatic and effectual protest against such wholesale diversion of their revenues."

Why do I recall these things? Not simply to remind you that this coöperation of the medical journals with the medical profession is an excellent example to the dental journals and the dental profession, but rather to emphasize the fact that what is true of the medical profession is, to a considerable extent, also true of the dental profession. As far back as March, 1889, I wrote to the *Dental Cosmos*, to ascertain if anything on "dental charity" had ever been published. The reply of the editor was: "I do not recall that the subject has been discussed in any dental journal, and I feel quite confident that it has not been in the *Dental Cosmos*. The subject is a delicate one, because it concerns a natural but sometimes unprofessional rivalry between dental schools in the same city."

It is an encouraging sign of the times that, as Baltimore is the city in which regular collegiate instruction was first given in dentistry, so Baltimore dentists, appreciating that it is but seemly for the profession to avoid and suppress, as far as possible, the rapidly increasing source of pecuniary loss through a channel of their own making, have become the pioneers in the reform of indiscriminate service in dental college infirmaries, which reform will, in no small degree, benefit the dentists in that city and in other cities.

Concerted opposition to dental infirmary abuse has been organized in Baltimore, and the Maryland Dental Protective Association, composed of a majority of the practicing dentists in that city, not including those pecuniarily connected with dental schools, came into existence in February, 1890, the object of the organization being to regulate the administration of dental charity so that the greatest good may come of it. The members, believing that the impulse must come from the dentists rather than the colleges, are doing what they can to obtain an abatement of the evil which is making such inroads into their practice. Nothing, thus far, has resulted from the movement, except the adoption of the following resolution:

"That each of the dental schools be requested to place in the infirmaries (near the entrance) record books, in which shall be printed in bold type on each page, 'For the poor only,' and in which shall be entered the name and address of all applicants for dental services. After such registration, each applicant shall receive a card, also headed, 'For the poor only,' if he or she admits inability to pay the usual office fees; all others shall be rigidly excluded from infirmary privileges. This card shall be retained by the patient, and presented at each visit, and until the completion of all necessary services; when the card (endorsed by the operating student with his statement), shall be returned to the demonstrator and placed on file. The record books and the cards shall be open for public inspection at all reasonable times."

The President of the Association has also visited the Mayor of the city, to request that no appropriations be made to the dental schools for 1891, unless in the contract there be included a provision that, 1, all applicants for dental services shall be registered; and 2, that the record books shall be open for inspection. Appropriations of $400 and $500 had been made in 1888 and 1889 to one of the dental schools, "for supplying medicine to the indigent sick of the city of Baltimore."

In what follows, I wish it to be understood that I have no reference to any special college. My remarks, I think it not improper and possibly not unimportant to say, are addressed to the system generally. Many of the facts are calculated to arrest the attention and engage the study of the best men in the profession.

Believing that every reform was once a private opinion, and acting upon the advice of Emerson, that "that statement only is fit to be made public which you have come at in attempting to satisfy your own curiosity," I, judging it expedient to gather light from quarters deemed trustworthy, wrote to deans of dental schools, to determine whether dental college infirmaries truly deserve

the designation of charities. The general result of the inquiry confirmed the impression that there is an enormous abuse of so-called dental charity by the almost reckless admission of all comers, and that the practice of some colleges is large and pecuniarily profitable.

As no man's personal rights are in the issue, I give you some of the information elicited as to infirmary charges and infirmary practice:

1. "Our infirmary privileges are extended only to those unable to pay the usual office fees (all others are rigidly excluded); gold fillings 75 cents to $2.50, amalgam and other plastics 25 cents to $1, vulcanite (full upper or lower) $5.50, gold or continuous gum $25; no record of charity patients to whom relief is extended without fee other than extractions and pathological cases;" 2. "The charge made is intended to cover actual expense of materials used, and whatever may be used in a charitable way; there is usually a surplus of receipts over expenditures; minimum charge for filling with gold 50 cents, for dentures $6; these amounts vary of course if a larger quantity of material is used or in the case of dentures being made on metal bases;" 3. "The dental college charges simply for material used in plugs and dentures and tries to avoid doing for people who are able to pay regular dentist;" 4. "We average about 8,000 patients of all kinds yearly; charge for gold fillings and other work about what material costs, estimating rather over than under, as we can't afford to lose by our good works;" 5. "The fund we collect from our clinics amounts to about $5,000 per year of ten months, which we are in operation;" 6. "Charges are slightly more than cost of material; we aim to have the infirmary self-supporting;" 7. "We try to have the charges for material used cover the waste and as much of the running expenses of infirmary as practicable;" 8. "Gold for about 1,000 patients, for which a profit is charged; make no distinction in patients;" 9. "No regular tariff for services; endeavor to discourage well-to-do, by making charges higher than in office;" 10. "Charge for gold filling about one-half what dentists charge;" 11. "Our purpose is to make infirmary self-sustaining," etc.

The time-work—the only legitimate work—of dental colleges—should be to educate students for professional life, to perfect the professional education of the dentist. But this preliminary training should not be used, as it sometimes is, to lower the dignity or emoluments of private practice. For pecuniary interest, some faculties attract as many students as possible (over 3,100 were in attendance at the various dental colleges of the country for the session 1890–1891) whom they send forth in the spirit of rivalry into the ranks of the profession without a thought that the means of subsistence for these men is diminished by dental infirmaries taking patients which these graduates should have, that having raised up these men to professional life they have the further duty not to pull them down, and that they are warring upon the livelihood of their professional brethren with the inevitable result of all active competition—lower prices; with the prospect that, as the ranks become more crowded, the competition must become keener. Is it any wonder, then, that men often lose heart after struggling for a time against so powerful and so unscrupulous a rival as every dental college infirmary is, whose anxiety for abundance of clinical material is so pressing that there is no discrimination, or hardly any? and that men of talent and respectable professional ability are forced to adopt rates that will in a measure compete with clinical fees in order to secure at least a moderate share of practice, or be driven out of the profession to find support in some other occupation for which they are wholly unsuited by reason of long years devoted to professional labors? Have members of the dental profession no feelings which influential dental colleges are bound to respect?

More than 50 years ago, as you know, the *first* dental college was founded. It was the purpose to give the institution a high character at the start. After it had become necessary to establish an operating infirmary, "for the benefit of the students," this announcement was published:

"There exists abundant opportunity for practical instruction in the Dental Infirmary attached to the institution. The appreciation and consequent demand of such operations as are here performed is steadily increasing among the indigent of our city. It may be necessary to add that these operations are not performed by the professors in the presence of the class, but by the students themselves under the immediate eye and direction of their instructors. In fine, the object of the institution is to perfect the professional education of the dentist, which may or may not have been begun under some competent private instructor and which, it is recommended, should be pursued during the summer vacation in some dental office."

Has the stamp of character the infirmary then received, endured? Have the purposes of the originators of the dental infirmary, who started it not as a money making experiment but for the benefit of the students and as a humantarian agency, been perpetuated in all the dental colleges which are pleased to acknowledge their origin? Are "operations performed among the indigent" only? Are dental colleges actuated solely by a desire to do good to the very poor? Is attendance at the dental infirmary taken by all the patients as a confession of poverty? Is it customary for students to be found "during the summer vacation in some dental office," or are they to be found at the college filling teeth and

making plates for the pecuniary profit of those who, in the language of students, "Run the infirmary for what they can make out of it?"

The origin of the dental infirmary has been told you; the evolution of the abuse can readily be traced.

1. "Operations among the indigent"—"all expenses borne by college."

2. "Students have the privilege of operating upon their own private patients."

3. The natural development has been that services have been rendered infirmary patients who could pay a proper fee; that "during the sessions, the operative and mechanical departments are now so well patronized, that every student can obtain as much practice as it is possible for him to attend to;" that "the clinical material is abundant, there being an excess of patients;" that "*the practice for dental students* has increased to such an extent that all the students, during the past session, have had an abundance of practical work, in both operative and prosthetic dentistry—the record books showing to the credit of many of them *hundreds* of gold fillings inserted for infirmary patients, besides other operations. This means for practical instruction has already assumed such large proportions that the supply has been beyond the needs of the large classes in attendance during the past sessions."

That the competition of some dental college infirmaries affects to an appreciable degree dentists injuriously, will be obvious to every reflecting person, at the bare mention that "about 25,000 patients are attended to yearly" by one dental college, and "on an average for nine months in the year, relief is extended to about 100 patients a day" by another; that one dental college which was "extending relief to more than 2,000 charity patients" in 1889, reported next year (1890) "more than 10,000 of such cases," and another which reported in 1889 "the charity patients number 4,312," in 1891 (two years later) gave the number of cases "12,000 or 15,000." None of these are located in the great metropolis whose college of dental surgery reports only about 6,500 patients are treated annually, (possibly because) "we charge for the material used in all branches of dental surgery."

This competition is most onerous to the dentists of least income, and to the practitioners who are struggling against the odds of cheap dentistry in an effort to maintain an honorable position, and eke out of their labors sufficient income for a respectable living. The dental infirmaries being open to all classes and conditions of men and women who desire low-priced services, few, if any, questions are asked, as long as the charges are paid, no matter how elegant and costly the habit, nor how many jewels displayed. This pernicious example of cheap dentistry is an injustice to those dentists who resist mercenary competition, and endeavor to render their bills in conformity with standard fees.

Are there not poor enough to supply clinical patients without encouraging the well-to-do to degrade the profession by responding to the enticing and seductive advertisement, "Many of the operations are performed free of charge, and all others at the cost of materials only," or the knowledge that "during the first two months of the session we furnish all materials to patients free of cost," although it may be said in excuse of the work done for them, "The operations are faulty and but the handiwork of students?" Is it not true benevolence and sound policy to remove, if possible, competition from those least able to bear it? If fair-minded men think so, if the faculties of the dental schools think so, then let the welfare of the whole profession supersede and extinguish the selfishness of the few.

A dentist who would endeavor to obtain practice after the model of the pretentious dental infirmary announcement (which appeals not in vain to the large number of persons who prefer quantity to quality)—"free to all—all operations known to moden dentistry performed in most workmanlike manner—gold foil and artificial teeth at actual cost—amalgam or silver, white, tin and gutta percha fillings free—this is the first time such an opportunity has ever been presented to every one to save those important organs (the teeth) free of cost—old and experienced demonstrators in charge—the same decorum will be observed as in private office, etc."—would be accused of unprofessional conduct, of acts unworthy the lowest grades of the profession, and set down among his fellows as unprincipled, a professional outlaw fit to "send to Coventry."

But, it may be asked, if a corporation of dentists may publicly advertise, why should a private practitioner be debarred? Should not dental faculties hold themselves amenable to professional laws, customs and courtesies? Is the sense of personal responsibility and personal honor depressed when the individual dentist is merged in the abstract entity of a dental corporation? However painful it may be to admit, it cannot be denied that methods which are legitimate for a dental college are not improper for the individual dentist, although claimants for public patronage may not see the question in this equivocal position after they have worked themselves into dental college faculties, by favor rather than merit, and thereby converted the dental infirmary into an ally instead of a rival. That, say what you please, is the plain English of the matter, and it may as well be spoken.

But the effects of the practice are not worse than the statements in the advertisements. One of the most pregnant counts in the indictment against the dental college infirmaries is that they advertise "gold foil and artificial teeth at actual

cost," when really the cost to the colleges for artificial teeth is absolutely nothing, the manufacturers "furnishing teeth to the infirmaries without charge, which teeth are sold in plates at (say) 2,000 per cent. above the cost of material used, and the gold foil is sold at a profit of 100 or 200 per cent. Dental colleges should give an equivalent for the fees they demand; to do *more* is charity, *less* is fraud.

Lest it should be thought I am making statements to suit my argument, let me quote what those think who ought to know best, from the opportunities of observation or experience. The views expressed by the gentlemen are creditable to their sense of justice, and will have such weight with the membership of this Association and with others as they are entitled to.

Dr. Shepherd, President Masachusetts Board of Registration, whose caustic criticisms are yet fresh in the minds of readers of dental literature, says:

Suppose one college furnishes only No. 3 gold in the infirmary, and sells each sheet for 70 cents, making a profit of $60 per oz., and another college furnishes No. 4 gold, and sells it at 40 cents a sheet, making a profit of $14.40 per oz., would it not be reasonable to infer that the former was run more for profit, and the latter more for the advantage of the student?

Has the infirmary answered its purpose when it has been successfully run as the Cheap John shop? Some colleges have sixty or seventy chairs. How many demonstrators are there present all the time? I ask any one who has had experience as demonstrator if he does not consider that he has been handicapped as an instructor by having too many operators to look after? Is it a rule in every college that no student shall ever commence the insertion of a filling until the cavity has been pronounced properly prepared by the demonstrator? This would seem to be a reasonable rule.

Are the demonstrators always selected for faithfulness and competency? Is a man who graduates one year generally competent to instruct a student the next year, to be the arbiter as to the how, what and why of the multifarious and complicated conditions that are constantly arising? Such young men, without practice, can be hired cheap. But does the college fulfil its contract with the student by having young and cheap instructors, in the infirmary least of all places, though the professors may divide several thousand dollars apiece each year?

The testimony of Dr. David Genese, who holds official position in two dental schools, is:

It is well known that persons amply able to pay (occasionally persons of known wealth), claim the attention of the students, and needed charity kept so long waiting that they depart or do not get the work done, as the charges are sometimes as much as a young practitioner will make. Where is the charity? and how does the dental infirmary compare this with only "cost of material?"

No student should be allowed to appoint time for people to visit him at the institutions. Every patient should be first seen by the demonstrator, and the work given in rotation to students. The name and address, and occupation of the applicant should be obtained, and if found able to pay, should be referred to a dentist, and not, as at present, charged full fees to go into the pockets of the professors and demonstrators.

Dr. Ferd Groshans, a demonstrator, is of this belief:

From personal experience at the dental infirmary, as student and assistant, I could cite cases of patients who were able to pay, and had their teeth filled and plates inserted, to their own disadvantage, as well as to the injury of the science of dentistry, both of which are due, in my opinion, to the want of a larger number of instructors, as well as to the inexperience of the new beginners. I think a less number of patients would be sufficient, and of more value to the student, if the instruction would be more of a personal supervision and more constant by the demonstrators in charge. I do not think a student should be left so much to himself as is the practice at present. The infirmary practice, as at present conducted, is detrimental to the patient, student, college, and the profession in particular, to say the least, and not considering the practitioner who must live by the legitimate practice of his profession.

These views a Vice-President of the National Association of Charities approved, and added: "We want fewer unworthy applicants, and a better service in the dispensaries."

Dr. J. L. Asay, of California, writing on "the pernicious effect of dental college clinics," says:

That such a condition exists was, to me, made apparent during my visit to the larger cities of the Atlantic coast, last year, but was not confined to any particular dental school. I found it, however, to predominate in Philadelphia, where there are no less than three dental colleges. It may possibly be that I observed this state of affairs more in that city than in other places, from the fact of my larger acquaintance there than elsewhere, it being my native city, and former residence for twenty-seven years, hence, other localities may furnish equal grounds for comment.

During the visit to which I have alluded, I frequently heard old practitioners complain of college operations and their fees. I heard men and women of good circumstances and comfortable incomes congratulate themselves and each other upon how cheap they had got their teeth filled or plates made at the dental college.

He continues:

We may rail against gas offices and bucket shops; five dollar sets of teeth, and "teeth plugged to last for life, for 25 cents," without avail, so long as we countenance the pernicious example of cheap dentistry and low fees by our institution of dental learning, to those who should be compelled to seek the services, if any be needed, of the regular practitioner, and pay a price equivalent to the time occupied and the skill employed.

This expression is confirmed by an official in Philadelphia, under date of April 30, 1891, who writes:

In this city, with its three large dental schools (having in attendance over 700 students during the last session) actively competing for patronage, the evils of indiscriminate charity are seriously felt by a large number of worthy practitioners. Such charity certainly tends to cheapen the services of the dentist, and in many cases causes young graduates to resort to questionable methods of obtaining a remunerative practice. The question is of vital and timely importance.

In conclusion, what is the duty of the hour? What, it may be asked, do members of the dental profession propose for the evil which they allege to exist so much to their prejudice and detriment? Is it to close the dental infirmaries? Not at all, except, possibly, during the vacation when no lectures are delivered, because in our present social condition the dental infirmary may

be necessary (I will not say necessary evil). They suggest a cure more humane, more salutary, more manly, more worthy of them. It is that dental infirmary privileges be extended only to those unable to pay the usual fees of dentists because it is believed that the practice of dental schools in throwing open their doors to whoever may apply, injuriously affects both the public and the dental profession. (The testimony upon this point is so honorable to the dentists of Baltimore that special attention is invited to it, as it has been affirmed and re affirmed by members of the Maryland Dental Protective Association, and is in fact the sentiment that led to the organization).

Very true, you say, but how is it to be done? If a line could be drawn, where would you place it? I suggest the following for consideration, as possible remedies; other thinkers may be stimulated to supplement what has been omitted. Oneness of aim does not imply identity of means.

1. Go back to the practice of the time-honored pioneer—an operating infirmary "for the benefit of the students"—operators "among the indigents" only "by the students under the *immediate eye* and direction of their instructors"—"*all* expenses borne by college."

2. Let no "students have the privilege of operating upon their own patients (private) during the sessions" either at the college or at their homes.

3. Provide for dental infirmary privileges to persons recommended by dentists, or by some inquiring agency, familiar with the circumstances of applicants, similar to the Charity Organization Society, of Baltimore.

These are simple suggestions, and it only remains for the dental colleges, more especially rival institutions in the same city, or those which aim to "have the infirmary self-supporting," or "have a surplus of receipts over expenditures," to put them in practice. Even if it had been found difficult to devise remedies, the calling of public attention to the evil would have been useful.

Some dental colleges, to their honor be it said, already discriminate; as for instance the University of California College of Dentistry whose rule is "Infirmary privileges are extended only to those unable to pay the usual office fees" (all others are rigidly excluded); or the Philadelphia Dental College which "tries to avoid doing for people who are able to go to regular dentists;" or the Indiana Dental College, which uniquely "endeavors to discourage well-to do people by making charges a little higher than those ordinarily made in offices;" or the University of Maryland Dental Department, "whenever it is possible to discriminate, the patients supposed from general appearance to be in good circumstances (as we have no other means of judging as to financial ability) are rejected in favor of the poorer classes of patients. We shall continue to pursue this course as an act of justice towards the dental practitioners of the city of Baltimore and the State of Maryland."

The interests of the dental profession and of the dental colleges are really identical, and they should be made practically so. At present there is a combat between those with whom unanimity of purpose and honesty of intention should prevail. Each sets the other at defiance, and as a rule, there is little kindly feeling and few friendly acts on either side. It would be otherwise if the graduates of dental schools, instead of having to suffer from acts prejudicial to, or sometimes injurious, to their interests, were made the objects of a generous, parental care. Such consideration would dispel antagonism, and the charity of the public could be confidently appealed to, with the support of the profession, notwithstanding there would be (apparently) a falling off in the number of patients at the dental infirmaries.

This is an age of associations, hence it is desirable that the State societies be formed which shall coöperate in protesting emphatically against the abuse of dental charity and in taking effectual measures for its correction, so that in case of application for State on municipal (financial) aid on the plea that "the faculty are receiving now scarcely any remuneration—they ask that they be relieved from the cost of the very charitable institution which they have necessarily connected with the college;" or "the faculty find themselves compelled to ask aid from the State—they are not willing that the institution shall perish without giving the State an opportunity to preserve it," it may be made known that no such assistance is given in the cities of Boston, New York, Philadelphia, Washington, Chicago, Indianapolis, Cincinnati, Louisville, Minneapolis, San Francisco, by the taxpayers to the dental schools.

The paper was discussed by Dr. Taft of Cincinnati, Dr. Clara McNaughton of Washington, Dr. J. J. Williams and R. R. Andrews of Boston and E. S. Talbot of Chicago, after which the following resolution was unanimously adopted:

Resolved, That this Section would suggest to the National Association of Dental Faculties, the importance of some action towards correcting any abuses of the charities of infirmaries or schools.

Dr. George W. Whitefield read a paper on

PATHOLOGICAL CONDITIONS PRODUCED BY GALVANIC ACTION BETWEEN DISSIMILAR METALS IN THE CARE OF TEETH.

and then illustrated some of the points in his paper by an exhibition of electrical apparatus.

To arrest the causes that destroy the teeth,

fillings of different kinds have been and are being used to repair the loss of continuity of tooth structure, to protect exposed parts, and restore the contour of the organ Prominent among these filling materials are gold, tin, cements and amalgam, or, as it is sometimes called, silver. It is composed in varying proportions of tin and silver, with a small amount of gold or platinum amalgamated, as the term implies, with quicksilver. There are also amalgams of copper, and some containing zinc.

In a general way, I will now introduce the subject of this all-pervading mysterious form of vibration we call electricity. Different qualifying names are employed to designate the kind of electrical manifestations, as magnetic, frictional or static, galvanic, voltaic or dynamic and thermal electricity.

We find that all molecular disturbances give rise to disturbed electrical equilibrium; all motion tends to produce this condition. We notice the result only when the conditions are favorable, that is, when the conditions are such that the equilibrium is not too easily reëstablished.

Electricity is termed positive (+) when it has force to impart, negative (—) when it will require such an amount of electrical energy to restore the electrical equilibrium. The difference of electrical conditions is termed the difference of potential.

Difference of potential is a difference of electrical conditions, by virtue of which work is done by the electrical vibrations in moving from the point of higher to that of a lower potential, and is measured by the unit of quantity of electricity thus transmitted.

The passage of electrical vibration from the point of higher to that of lower potential, is termed electrical current, and the bodies along which they pass are conductors. The opposition to the passage of the current is termed the resistance.

In order to understand the action of what is called electric current, I will give the familiar illustration of two reservoirs of water connected by a pipe. The electric current may be likened to the flow of water through this pipe from the higher to the lower level. The unit of current strength, also called the rate of flow or intensity, is the ampère. In the illustration we would say the water is flowing through the pipe at the rate of one gallon per second. In speaking of the electric current, we would say it has the strength of, say one ampére.

The unit of electromotive force, also called electrical pressure, or tension, or difference of potential, is the volt. In the illustration the head of water, or the difference between the levels A and B, is similar to the electromotive force.

The unit of resistance is the ohm. Resistance may be compared to the friction the internal surface of the pipe offers to the water. It follows that the more cross-section the less friction, and the less cross-section the more friction, for the same volume of water flowing through the pipe in a given time.

Conductors are good or bad as they convey or resist the passage of the electrical current; different metals vary in their conductivity, silver and copper being high in the scale, while German silver and steel retard the current; moisture is a good conductor, while glass, kerite, rubber and dry air are among the poorest conductors; the resistance varies with the length of the circuit, the conductivity and cross-section of the conductors.

As the current is the same strength throughout its entire length, it naturally follows that the larger the conductors, other things being equal, the less the resistance, and on the other hand, the lessened surface or poorer the conductor, the lessened current and reduced activity of the battery. When the current is too great for the conductors the wave length is shortened to that of heat, which varies according to the current and the conductors. The wave length may be shortened to that of light vibrations so that the conductors may glow as in the incandescent lamp or cautery snare. Heat generated in this way is now employed in electric welding, and for the fusing of metals requiring a high temperature, such as platinum, iridium, etc.

Magnetism derives its name from the place where magnetic ore was first found—Magnesia, Asia Minor.

Frictional or static electricity, is of but little interest to us as a profession, although often, in a dry atmosphere, it may be a very annoying companion by the dental chair, when each movement of the operator produces by friction a difference of potential between the operator and the patient; then if the discharge is by way of an instrument to a filling, or moisture in a cavity of a tooth, the result, to say the least, is unpleasant, and often quite startling if the patient, by jumping, upsets the instruments.

Frictional electricity is to galvanic electricity, what a red hot needle would be to a large, moderately heated crow-bar; the crow-bar contains more heat than the needle, but one has a volume, the other intensity. Frictional electricity is so intense that it will jump through air, the length of the spark being governed by the intensity of the current.

Galvanic electricity, on the contrary, will traverse the circumference of the globe, rather than leap a short space. Galvanic, voltaic or dynamic electricity, is the particular manifestation of this force, most interesting in a practical way, to the dentist. The current derived from the battery is called galvanic or voltaic, in honor of the experimenters who, less than 100 years

ago, discovered the method of generating and collecting the force through chemical action. It is this manifestation of electrical energy that is employed in the arts, consequently the name dynamic.

Where the extensive use of electricity is required, the dynamo is employed for economical reasons.

Batteries consist of positive (+) and negative (—) elements, immersed in an exciting fluid, or fluids. The fluid employed varies according to the construction of the battery, and kind of work to be done, being acid or alkaline; though even pure water will generate a current, if two metals are immersed in it where one metal is more readily oxidized than the other. (Note the fact that action would take place if the elements were composed of two samples of amalgam, if one was composed of less oxidizable metals than the other).

The positive (+) element of the battery is the one on which the exciting fluid acts, that is, the fluid destroys the positive (+) element, molecule by molecule, while the negative (—) element should sustain no loss of structure. If the negative (—) element is acted upon by the fluid, counter currents are generated which interfere with the usefulness of the battery. I spoke of the resistance of the conductors; the fluids of the batteries impose resistance, termed the internal resistance. The electrical energy of a battery is the energy of the current, less the internal resistance, and the resistance of the circuit. The resistance both internal and of the circuit, modifies the action of the battery. If the elements are connected with wire of sufficient size to convey the current, the electromotive force will be reduced in proportion, as the length of the wire is increased, or the size (cross section) of the wire is reduced; while, if the elements touch in the fluid, the action is most violent, and the batteries soon become polarized, that is, the surface of the elements become so changed that the fluid ceases to affect them or the fluid becomes so saturated with the waste product of the combustion of the positive (+) element that action practically ceases, unless provision is made for it by having the fluid constantly renewed, as in some kinds of batteries designed for constant work.

When the circuit is opened shock is felt, if the current is of sufficient strength; this shock is the result of the magnetic energy being suddenly discharged; different devices are made use of to produce this result, such as the induction coil, constructed with a vibrator, which rapidly makes and breaks the circuit; an example of this is the medical battery, and the Ruhmkorff coil; the current produced in this way is called the Faradic.

Now, to apply the foregoing to the battery formed by dissimilar metals in the mouth, where the fluids of the mouth are the exciting media, gold will be the negative (—) element, as the fluids of the mouth have no action on this metal. The positive (+) element is the baser metals, whether used separately, as tin, or, as most commonly, the combination of mercury with tin, silver, zinc and copper, as in the amalgams in use.

With gold and tin to form the voltaic pair, the base metal soon becomes coated, and the current practically ceases, but with amalgam, the mercury performs the same office in the mouth that it does in the laboratory; it presents the metal in a form that is easily acted upon by the exciting fluid.

We always have good conductors in the fluids of the mouth, containing, as they do, mucus and various earthy salts, while often the fillings touch in the same mouth, or as approximal fillings of gold in one tooth, and amalgam in another.

We always have good conductors, although the resistance varies in each individual case, according to the character of the secretions, or the situation of the fillings.

The action will vary according as the conditions are changed. Naturally, where food is left between the teeth, to decompose, the acid resulting from such fermentation will form a more exciting medium than normal alkaline saliva. Where a filling is left rough and jagged, overhanging and irritating the gums, it presents an exaggerated surface to be acted upon; besides, by irritating the gums, it causes a secretion from them that forms an excellent exciting fluid. This is, unfortunately, the too frequent result of careless operating.

Now, what of it? Is this only theory? Are these statements founded on scientific facts? Can they be established by proof? *The Western Electrician* of February 11, 1888, says, in reference to a talk I gave before the Chicago Electrical Club:

"Dr. Whitefield, before the Chicago Electrical Club Monday evening, succeeded in settling a question that has been in dispute among dentists, as to the electric action of amalgam and gold fillings in the same tooth, or even in the same mouth.

"That a current was generated by the amalgam and gold fillings when placed in water, even when they were insulated from each other, was conclusively shown by bringing a galvanometer into circuit. The point is one that may be combated, but the evidence produced by the galvanometer cannot be controverted."

Now if there is galvanic action, what harm can it do? Let us quote from an article on amalgam in the November *Dental Review*, 1887:

"Now the question arises: Shall we ever use amalgam and gold in the same tooth, and if so, why? and if not, why not? There has been such varied teaching in the past in regard to this subject, that it is time the old errors should be ex-

ploded, and scientific teaching presented to our students of to-day. The old way was to put both amalgam and gold in the same tooth, if it seemed necessary, but never let them touch each other, or grave results would follow. After seeing such methods pursued for a term of years, we find that, in spite of the teachings, grave results did follow, which ultimately resulted in the loss of the gold filling, while the amalgam remained comparatively sound, or, rather, the tooth structure surrounding the amalgam filling."

This is correct—but to go on and see the writer's following statements:

"We have found that if the two metals touch in the electric battery, there is no longer a current, it is dead, no shock is produced, and it is just the same when the metals are in the tooth in the presence of an acid, as it is out of the mouth in the laboratory. Therefore, we found, first, from an unpleasant experience, and later from theory, that if amalgam and gold are placed in the same tooth, they should have an uninterrupted communication, should be in complete apposition, so that no electric or galvanic action can take place, because they touch each other."

Let us consider these statements, and see if they harmonize with the laws of physics. Now, if the elements touch (the fillings), there is practically no resistance in the circuit, consequently the battery's action is most violent, up to the capacity of the battery to generate current.

The writer says no shock is produced. He is right; the current flows evenly through the short circuit, so the equipoise is practically maintained, and shock is produced only when the current is interrupted, when an accumulation of energy is suddenly discharged.

To be fair, I will essay to point out what has misled my friend into making these rash statements.

If gold and amalgam touch in the same tooth, there is practically less destruction around the gold filling. This is easily explained, as the galvanic action is so violent that the surface of the amalgam filling is soon destroyed; that is, all the baser metals are consumed from the face of the plug, leaving the silver, gold or platinum of which it is composed, on the surface, which practically changes the amalgam to nearly a silver surface, thus raising it to nearly a negative metal, while beside this, the coating protects even the surface of the silver.

This statement holds true with regard to very old plugs of amalgam; their surface is no longer amalgam, it is negative metal.

But at what fearful cost are such old fillings raised to the dignity of negative elements.

We will now note some of the harmful phases of this subject.

First: Galvanic action has a tendency to accelerate the blood flow, producing hyperæmia and hyperæsthesia, and in some cases violent nervous phenomena. This is especially the case where, from the situation of the fillings, the energy is accumulated, then suddenly discharged, producing shock, as each can demonstrate by touching a bit of zinc or the blade of a penknife to a filling in your own mouth.

Second: The current is generated from all parts of the elements that come in contact with moisture, and are not protected by a coating. The portion of the amalgam filling that is protected by tooth structure becomes so coated that there is practically no action except on its exposed surface. On the contrary, gold remains bright on all its surfaces, and as moisture pervades the whole tooth, no matter how well the filling is inserted, moisture will reach it by way of the inter-tubular spaces, consequently electrolytic action can take place from all portions of the gold elements, naturally causing considerable destruction around the gold filling, and this is not all electrolytic action takes place. Among the commonest elements found in the mouth is chloride of sodium (salt); galvanic action readily breaks up this compound, the chlorine liberates oxygen and unites with the hydrogen of the water, forming hydrochloric acid, and leaving the oxygen in its most energetic state (other acids may be formed in this way, such as sulphuric, nitric, etc.). The electrolytic action, and the acids thus formed, are sufficient to roughen the surface of the teeth to give lodgment to colonies of "microbes."

Is this all? No. Chlorine, in its nascent state, will readily unite with the mercury of the amalgam, and the chlorides of mercury may be formed in sufficient quantities to produce symptoms of mercurial poisoning in those susceptible to its influences. These salts of mercury may also explain the immunity from decay of teeth stopped with ill-fitting amalgam plugs, the germicidal effects of the mercury being sufficient to prevent colonization by microörganisms, and consequent destruction of the tooth.

The oxygen might, from peculiarities of the individual case, unite with other salts than those of the teeth, and the same with the acids. We all know that the neglect some mouths get would be total destruction in others. The elements that usually produce decay would seem to be inert in their case, and the same condition undoubtedly explains why electrolytic action that would destroy in one case is apparently harmless in others, although such cases are in the minority.

The usual result of placing amalgam in the back teeth, while gold is placed in the front teeth, of children, will explain why the gold fillings have to be renewed so often; also, that in the electrical action is a clue to the oft-repeated tale brought to us by the laity, that amalgam stands better than gold, as the amalgam still remains, and the gold fillings, that have been replaced several times, are loose again.

If amalgam must be used, use those grades that will readily become coated, as the coating will reduce the galvanic action, protecting the plug from the fluids of the mouth, except where attrition and brushing keep them bright. Gold and amalgam, in fact any metal, should be avoided for teeth which are of such soft structure that the pressure produced in inserting gold would tend to break down the tubuli, while metals never stand well in teeth of very soft structure. In fact, you can as well expect to prevent water flowing under the edge of a board resting on the ends of the blocks in cedar block pavement in the street, as to expect to exclude moisture from a soft tooth with a metallic filling, as moisture is bound to penetrate between the tubuli. Even the normal plasma exuding from the tubuli will have a tendency to assist the destruction of the hard structure when it becomes vitiated, as it must in the temperature of the mouth, as it is a foreign substance when lost from the tubuli, as is the blood that weeps from abraded gum tissue.

The cements and gutta percha are the only filling materials that should be employed for filling such teeth. If you will use these materials, in the course of eighteen months or two years the tooth will be found quite hard, and capable of proper manipulation, to prepare it for the king of metals and the king of filling materials—gold. A tooth treated in this way will not be as sensitive, and the fillings will last.

Dr. Williams: In this experiment one element is amalgam. What is the composition of that amalgam?

Dr. Whitefield: Ordinary commercial amalgam. I don't remember its composition.

Dr. Williams: One point that I can see in this paper is, that what we have practiced can be verified by strict scientific experiments. I will simply say one or two words that I have noticed from general observation, and am convinced that amalgam with zinc is more liable to produce galvanic action than without zinc. Another point is, that in several cases where there has been decided galvanic action, I have found that the galvanic action was less or not existing at all by combining as large a proportion of gold foil with the amalgam as possible. It is on the theory in a general way that by mixing the gold, if there is gold filling near, it lessens the difference between the metals and so lessens the galvanic action; that is my theory, practiced on for years.

Dr. Marshall: I am interested in this paper, and also in the experiments, and have this to say of some experiments I have seen. Dr. S. P. Palmer of Syracuse, N. Y., demonstrated fifteen years ago, or rather I should say proved very conclusively that there was not only action between teeth structure and metal fillings, gold and amalgam plugs, but also between gold and tin, and between tin and amalgam, but of course the action was not so great between the latter as between gold and amalgam. He also went considerably further than this in his experiments. He proved conclusively that a galvanic action was established between any two dissimilar materials when moistened with a solution of chloride of sodium or saliva producing a distinct deflection of the needle. Another experiment seemed very strange at the time; for instance, he was in the habit of taking two foods which we eat in pairs, as the most palatable, such as ham and fried eggs, a piece of mutton and tomato sauce, a piece of turkey and cranberry sauce, in fact he followed it all through the foods which we naturally eat in pairs as being most palatable, and he found that by moistening these with saliva that there was a deflection of the needle as a result. He then made this suggestion, that it was on account of this peculiar galvanic or electrical action present between certain dissimilar bodies or kinds of foods, zest of taste or relish is given; that by the decomposition of the saliva produced by the electrical action between the foods.

"How many of us ever tasted water as good as that of the well on the old farm. Dr. Palmer would ask what did you drink out of, the tin dipper? The contact of the metal dipper with the moist lip produces a galvanic current. That is the solution of it." I am inclined to think that there is a good deal in this. I just mentioned this to show what has been done experimentally in this very direction by Dr. Palmer. Most of you know that Drs. Palmer, Flagg and Chase were the three men who made up the new departure trio. Their idea was that gold was not always the best material to use in the filling of teeth; that sometimes amalgam was better than gold itself; on account of the low galvanic condition which existed between amalgam and some of the baser metals and tooth structure.

Dr. Williams:—There is one point in regard to Dr. Palmer's idea that I would mention which I think is a little wanting, because I think as a general thing, and certainly the poet so mentions it, that the most delicious flavor of water is from an "old oaken bucket."

Dr. Marshall:—Another point Dr. Palmer in his experiments also proves was that just as soon as the surface of the amalgam plug became thoroughly oxidized the electric current ceased. It was only in such cases in which the plug remained bright that this action continued. You all have, no doubt, noticed that when an amalgam plug has been placed in a tooth in contact with a gold plug, in a few days oxidation commences; and it used to be thought that we must leave a bridge or partition of dentine or tooth-structure between the two plugs, but we found after a time that the tooth at the cervical margins of the plugs was very soon dissolved

away, and that when you allow them to come in contact this condition did not occur.

Dr. Custer:—I think you might gather from this that the amalgam which oxidizes most easily will be the best.

Dr. Whitefield:—I made a statement that where amalgams oxidize rapidly they are best; zinc will never oxidize thoroughly. I will state the following cases: a patient came to me for treatment and while under my care she complained that the fillings that had just been inserted were giving trouble. It immediately called my attention to the electrical action. I removed the amalgam filling and in a short time all trouble stopped. Using amalgam in preference to gold in some cases has been suggested. In some cases they need a kind of a whip. There needs to be some kind of a stimulant.

Dr. Williams:—I would like to say that I hope that Dr. Whitefield will try a suggestion of mine which is to mix as much gold as possible and then to put it under test. I hope he will try it practically, scientifically and mathematically; not try to find a certain thing, but try to see what he can find.

Dr. Marshall's paper was next read:

THE RHEUMATIC AND GOUTY DIATHESIS, AS MANIFESTED IN DISEASES OF THE PERIDENTAL MEMBRANE.

BY JOHN S. MARSHALL, M.D.,
OF CHICAGO, ILL.

In nearly all our text books on dental surgery and dental pathology, mention is made of the fact that rheumatic and gouty individuals sometimes suffer from irritation of the peridental membrane, causing the teeth to become more or less sore and loosened in their sockets; supposedly the results of the peculiar diathesis of the system, but farther than this no light is thrown upon the subject.

Clinical and post-mortem experience teaches that the *materies morbi* of these diseases has a predilection for the fibrous structures of the body, especially the synovial membranes, the aponuroses of muscles, the dura mater, the cardiac tissues, periostal and peridental membranes. The one most commonly affected is the synovial membrane, resulting in inflammatory conditions of the joints.

It not uncommonly happens, however, that there is associated with the inflammatory phenomena of the joints, enlargement of the long bones and nodular formations in other localities; and in the peri-cementum, conditions which are somewhat analogous.

The predisposing and exciting causes of certain irritative conditions of the peri-cementum seem to have their origin in the same conditions which bring about the phenomena of gout and rheumatism, and they have also proved by experience to be amenable, in many cases, to the same specific treatment adopted in these diseases. This last fact has led me to the belief that the rheumatic poison is largely accountable for many of the diseased conditions of the peri-cementum, and has induced me for several years to make close and careful observation in relation to the prevalence of irritation of the peri cementum in gouty and rheumatic individuals.

This belief has been further strengthened by finding upon analyzing the urine of a number of persons suffering from peridental irritation of this character, that there was a considerable excess of uric acid in every case. The saliva also, in many cases, gives a decided acid reaction.

The peridental membrane seems to be very susceptible to the irritating effects of an acid condition of the blood, whether from an excess of lactic or uric acids retained in the system or from the ingestion of such acids as are found in sour wines and malt liquors.

The habitual use of sour wines and malt liquors often results in peridental irritation of a marked character, in individuals who have never developed symptoms of a rheumatic condition; while on the other hand the same irritative conditions are found in total abstainers; but these, it would seem, are due to rheumatic phenomena and are often the forerunner of an approaching attack of acute articular inflammation.

Congestion and thickening of the peridental membrane and temporary loosening of the teeth, accompanied with dull, gnawing pains and more or less soreness are a common occurrence in rhematism and gout. At times this condition is the first definite system to be manifested of an approaching attack of acute articular inflammation, while in others it does not make its appearance until after the first acute symptoms have subsided, and occasionally it is the only manifestation of this peculiar diathesis.

Chilling the surface of the body, or in other words taking cold, is usually the exciting cause of an attack, while an injudicious diet greatly aggravates it.

The presence of concretions upon the roots of the teeth is the most common cause of inflammation of the peri-cementum, and it has been generally supposed that these concretions were formed from the saliva.

It is my purpose to call attention to what seems to me to be a more rational explanation of the formation of these deposits in locations where the saliva could not, or could with great difficulty, reach. The saliva contains, as waste products, a certain amount of phosphate and carbonate of calcium which has been rendered soluble by the action of carbonic acid. A certain amount of ammonia is given off from the lungs as a product or decomposition of tissue; while

fermentation of alimentary débris lodged about the teeth also furnishes an additional amount of ammonia. This ammonia coming in contact with the saliva in the mouth, unites with a portion of the carbonic acid to form carbonate of ammonia, thus liberating a portion of the calcium which is thrown down in the form of a precipitate and lodges upon the exposed surface of the teeth. But when deposits occur at remote points from the gum-margin, it does not seem possible that this is the correct explanation of their presence in these locations. The law of gravity carries all bodies that are heavier than the medium in which they are suspended, downwards; consequently we must look for some other explanation for the presence of the deposits on the roots of the superior teeth.

Capillary attraction may possibly account for their location, but this seems hardly probable, for it presupposes the presence of a pocket, or a separation of the peri-cementum from the cementum, while the amount of saliva entering such an existing *cul-de-sac*, would be extremely small, and not likely to be changed at sufficiently frequent intervals to account for the rapid accumulation which takes place in some of these cases. We are forced, therefore, to the supposition that they are deposited from some other source, and under an entirely different group of circumstances.

It has been suggested by Dr. Ingersoll of Keokuk, Iowa, that these concretions were a direct deposition from the *liquor-sanguinis* which bathes the roots of the teeth during the suppurative stage of the inflammatory process. This may be the correct solution. It is true that calcareous material is sometimes deposited from pus, in proof of which might be mentioned the fact that the roots of teeth penetrating the antrum of Highmore and foreign bodies located in this sinus during suppurative inflammation, have been found when removed to be covered with calcareous deposits, but that this is a common occurrence in suppurative conditions in any locality, admits of serious question. I am of the opinion, however, that the deposition of the concretions upon the roots of the teeth in those localities not readily reached by the saliva, or in which the presence of the saliva would be an impossibility, are due to the causes which produce the chalky formations found in the joints and fibrous tissues of gouty and rheumatic individuals.

The thought has occurred to me, though I have not had time to demonstrate it positively, that the concretions found upon the roots of the teeth in the locations just named were masses of urate of soda with phosphate and carbonate of calcium, and that they are deposited directly from the secretions, as is often the case in rheumatic arthritis.

Furthermore, it would seem that these concretions were the cause of the inflammatory condition, rather than the result of it; in proof of this let me state that clinical observation teaches that suppuration often occurs about the roots of the teeth at remote points from the gum-margin, and which have no outlet until the peri-cementum is dissected from the roots of the teeth by the accumulation of the pus. I have seen cases in the lower jaw in which an abscess had been formed upon the roots of living teeth, between the neck and the apex, and in which the attachment of the gum at the neck of the tooth was intact and the pus did not escape until nature had perforated the soft tissue, or relief was given by the use of the knife. In such cases I have never failed to find concretions upon the root at the point of suppuration; this could not possibly have been deposited from the saliva, and it is fair to presume that the deposits upon the root was the source of irritation that produced the abscess, rather than that the inflammatory condition was produced by some remote cause and the formation of the deposit the result of the inflammation.

Dental exostosis, or hypertrophy of cement tissue, is an occasional occurrence in individuals of a gouty or rheumatic diathesis. It is most commonly found in chronic cases of long standing, and is often associated with enlargement of the joints.

The causes are in all probability the same as those which produce the enlarged joints. Chronic irritation of the periosteum tends to hypertrophy of bone; while the same condition of irritation in the peri-cementum produced hypertrophy of the cementum. The history of these cases is usually one of chronic irritability of the peri-cementum with periodical attacks of soreness and looseness of the teeth, while the cause of each attack is generally referred to some recent exposure in which the individual has taken cold. The acid reaction of the saliva and the urine at these times gives evidence of an acid condition of the blood. This would seem to indicate the cause of the irritation and suggest the line of treatment to control the immediate symptoms and the prophylaxis of the future.

Phagedenic Pericementitis is sometimes directly traceable to a rheumatic condition of the system or the uric acid diathesis. In several cases in which I have analyzed the urine, uric acid was found largely in excess of the normal quantity.

In all of the cases which I class as rheumatic, concretions are found upon the roots of the teeth, and many times in locations which preclude the possibility of a salivary origin.

Under restricted diet in which meats, wine and malt liquors are cut off, there is soon a marked diminution of the quantity of uric acid excreted, and an equally marked improvement takes place in the symptoms manifested in the

oral cavity, which cannot be accounted for by the removal of the concretions and local treatment alone. In one case which has been under observation for four years, the periodical aggravation of the oral symptoms are a sure indication of the presence of an excessive amount of uric acid in the urine, and as soon as this condition is corrected the inflammatory conditions of the peri cementum are greatly relieved. Local treatment is necessary, but this alone is not sufficient; we must strike deeper and correct the morbid condition of the system if we hope to effect a cure.

Other cases might be cited that would seem to further substantiate the opinions already expressed, but time will not permit. I trust, however, the matter has been so presented as to stimulate farther investigation into this subject, and I believe if your observations are carefully made you will agree with me that the facts and opinions presented warrant the supposition that gout and rheumatism are important factors in the production of a considerable variety of irritative conditions of the peridental membrane.

7 Jackson Street, Chicago.

(*To be concluded.*)

BOOK REVIEWS.

MINOR SURGERY AND BANDAGING, including the treatment of Fractures and Dislocations, etc, By HENRY R. WHARTON, M.D. Philadelphia: Lea Bros. & Co., 1891. Chicago: A. C. McClurg & Co. 8vo, half calf, pp. 497. Price $3.00.

The introduction of a new plan of bandaging in accordance with the teachings of antiseptic surgery has rendered many of the books on bandaging obsolete, and the present book fairly supplies the defect. It is a pleasure also to note that the writer is an American, familiar with American surgical appliances, which have too frequently been ignored in the foreign reprints with which the market has hitherto been flooded. Notwithstanding this we notice many familiar illustrations from the text books that flourished many decades ago.

In the main, the work is fairly illustrative of current minor surgery, but we suggest that in the next edition a more recent method of skin grafting be described than the old one on page 185. There are many cases in which the old Hamilton-Reverdin plan may be supplanted by the Thiersch method with advantage to the patient.

PRACTICAL INTESTINAL SURGERY. By FRED B. ROBINSON, B. S. M.D. Vol. ii, paper, pp. 206. Detroit: Geo. S. Davis. 1891. Price 25 cents.

The concluding volume of Robinson's Intestinal Surgery is a great improvement over the first volume; more care has been exercised in the proof reading, and the unfortunate lapses that we were obliged to mention, do not disfigure the volume under consideration. This volume shows careful experiments concisely set forth, with logical deductions therefrom.

There are eleven chapters, which comprise the main portion of the operative surgery of the work. Gastro-enterostomy, Gastrostomy and Resection of Intestine are here treated, and some interesting experiments on gun-shot wounds of abdomen are given. At the end of the book a number of diagrams appear, illustrative of the various forms of mechanical "aids" to intestinal surgery, and the different forms of suture.

In concluding the notice of the book as a whole, we have to say that the excellence of the second volume causes us to overlook the faults of the first, and to commend the volumes as a valuable contribution to the literature of the subject.

THE MICROÖRGANISMS OF THE HUMAN MOUTH. The Local and General Diseases which are caused by them. By WILLOUGHBY D. MILLER, D.D.S., M.D. Professor at the University of Berlin. With one hundred and twenty-eight illustrations, one chromo-lithographic and two photo-micrographic plates Philadelphia: The S. S. White Dental Mfg. Co. 1890.

The opening chapters of this volume are occupied with studies of the morphology and biology of bacteria, their vital manifestations and the methods of conducting bacteriological investigations. The procedures in the culture of bacteria are well described and illustrated. The body of the work is given to the consideration of the rôle which pathogenic bacteria plays in the production of diseases of the mouth and teeth. The chapters upon their agency in the production of dental decay are of special interest, and as such are a valuable contribution to the literature of dental pathology. While the volume is one specially designed for those who make the study of diseases of the mouth and teeth a specialty, it may well command the attention of the general practitioner, as it very properly considers the agency of microbes developed in the mouth, in the production of various diseases of the respiratory and digestive organs. The work gives evidence of much original and valuable research and will well repay a careful study.

A PRACTICAL TREATISE ON DISEASES OF THE SKIN. By HENRY G. PIFFARD, A.M., M.D., Clinical Professor of Dermatology, University of the city of New York, etc., assisted by ROBERT M. FULLER, M.D., with fifty full page original plates and thirty-three illustrations of the text. New York: D. Appleton & Co. 1891.

The plates of this work are a distinguishing characteristic. The avoidance of the misleading effect of the ordinary chromo-lithographic illustrations is to be commended. The plates were prepared from photographs, many of which were taken by the author himself, with artificial light which he says he prefers to ordinary daylight. The result is much more than the ordinary one in the effort to represent the appearance of pathological changes in the skin, and approaches more nearly the effect secured in wax preparations in demonstrating skin disease. The method has the advantage over such preparations of affording an exact photographic illustration of a case in clinical practice, which is always more satisfactory, if well executed, because of its being known to have existed, than any preparation however skilfully executed.

The text is concise—the descriptions are good, and the work will be recognized as entirely modern. The paper and presswork are superior in character, and the book is well bound.

The effect of the combined work is such as to make the physician desire to possess it.

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SATURDAY, OCTOBER 17, 1891.

PEDIATRICS.

A correspondent writes: "In one of your recent issues is found the announcement of the 'Third Annual Meeting of the American Pediatric Society.' Permit me to ask if it does not smack of affectation to give a name to a *National* Medical Association, which cannot be found either in DUNGLISON'S Medical Dictionary, or that of WORCESTER or WEBSTER, except, perhaps, in the most recent edition of the latter, which is in the possession of comparatively few persons. Will you kindly enlighten some even of your readers by giving definition of the word *pediatric*, and much oblige one of the latter."

The word *pædiatrics*, or *pediatrics*, as it is more frequently spelled to-day, is from the Greek, παῖς, παιδός, a boy, or child, and means diseases of children, or rather, the biology of childhood. Even the last edition of WEBSTER does not give this word, which is the more surprising, as it has been in somewhat extensive use for several years. Our correspondent should remember that dictionaries do not lead, but follow. We are unable to say how long the word has been in use, but certainly long enough to have found a place in first-class dictionaries.

We are inclined to think, however, that our correspondent's objection is not to the word pediatrics, but is intended as a criticism of the purposes of the society which devotes its efforts to the special study of the diseases of children.

Such great advances in the elucidation of the diseases of children have been made in recent years that it is worth while to see in what way it claims to be a specialty in medicine, and upon what grounds these claims rest.

The first systematic treatise upon the diseases of children appeared in Stockholm in 1753, the work of ROSEN V. ROSENSTEIN. This work[1] went through several editions, and was translated into German, Dutch, English, French and Italian. Later came the works of HARRIS, ARMSTRONG and UNDERWOOD in England, and still later that of BILLARD in France. These works did very little more than collate the ideas then extant on the diseases of children and form groundwork for the advancement of the subject. Nevertheless, even ROSENSTEIN expresses dissent from the prevailing idea of the etiological importance of "teething," and states that most often the troubles attributed to it will be found due to other causes. It was too much to expect that he could entirely emancipate himself from this fetich, and so we find him giving directions for determining when the teeth are at fault. Worms, however, held full sway, and the longest chapter in his book is on this subject. Sixty years ago BILLARD quoted GUERSANT on the etiological influence of teething, and agreed with him completely as to its insignificance.

Like "cold" later in life, "teething" since the days of HIPPOCRATES, has been credited with causation of most of the diseases of infancy, and like "cold," "teething" is being gradually pushed into the background. At the close of the Newport meeting of the Association, the chairman of the section of Diseases of Children remarked that he was delighted to say that never once during the session had he heard of "teething" or "worms." The ignorance which has ascribed such importance to "teething" and "worms," has assisted materially in maintaining the mortality rate of infancy. Better diagnosis with correspondingly better treatment, is taking the place of "teething" and "worms." It may be truthfully said, that the number of cases of "teething" and "worms" occurring in the practice of a given physician is an exact index of his inability to

[1] Underrättelse om Barns Sjukdomar och deras Bote-Medel. (Observations on the Diseases of Children, and Their Treatment.)

diagnosticate the diseases of infancy and childhood.

We have mentioned these older writers merely to show that the special study of pediatrics is by no means new. To even hint at the later literature of this branch of medicine cannot be done with the space at our disposal, but it seems impossible to avoid mentioning the works of EVANSON and MAUNSELL, RILLIET and BARTHEZ, in France; HENOCH, GERHARDT, STEINER, and VOGEL in Germany; WEST in England; EBERLE, and MEIGS in America. The literature of the diseases of children has increased immensely in recent years. Systematic treatises, and monographs on special subjects abound. No less than five periodicals, three in Germany, one in France and one in the United States, devoted to this special subject, bear evidence of the increasing attention paid to pediatrics. Its crowning literary jewel has appeared in America, in KEATING'S Cyclopædia of the Diseases of Children, a monument to the industry of its writers, and an earnest of the work which has already been done, and of the importance of the subject. If children were little men and women there would not be a specialty of pedriatics. But they are not. They have their anatomical and physiological peculiarities, their own hygiene, their own pathology, their own diseases, their own therapeutics. Special methods of diagnosis are necessary in infancy, and the physiognomy of disease here is peculiar. Prognosis does not follow the same lines as in the adult. The great problems of nutrition here find their peculiar field, and upon their proper solution depends the welfare of the future man or woman. These grounds seem sufficient to entitle pediatrics to the position of a specialty in medicine. As a few examples illustrating these statements might be mentioned the anatomical peculiarities of the naso-pharynx in the infant, particularly the small size of this space. This diminution in size makes coryza, so insignificant in the adult, often a matter of great importance to the infant, not infrequently leading indirectly to serious disturbance of nutrition. Enlargement of the bronchial glands is particularly a disease of childhood. Empyema is much commoner in children than in adults, and more insidious in its onset, frequently existing for months before detection. Rickets and allied forms of malnutrition are often overlooked in the child until their greatest damage has been done. Many of the neuroses of malnutrition in the infant are not recognized as such. The diseases of the mouth are most frequently met in childhood, and have quite a different significance from the same diseases in the adult. The great group of diseases of the alimentary canal differ so widely from similar diseases in the adult, that their successful handling must be conducted on an entirely different basis from their treatment in adult life. The single subject of infant feeding, particularly artificial feeding, is so beset with difficulties that one might almost say that it alone is worthy of being raised to the dignity of a specialty.

Pediatrics certainly is not a specialty in the sense ordinarily employed, which gives this title to the special study of the diseases of a single organ or system. And yet like these branches of medicine, it requires special training on the part of its practitioners, and has been most advanced by those who have given their time and study to it as a specialty. It is in one sense the least narrowing of all specialties because its workers must keep always before them the future man. "The child is father to the man," was the title of the address of the President of the Children's Section, of the British Medical Association at its last meeting, and while he strove hard to deny that pediatrics is a specialty, his address belied his words, as he showed most conclusively that the proper handling of the child had much to do with the success with which the future adult should avoid or bear the diseases to which he might be exposed.

Pediatrics is the specialty which the general practitioner most needs, and yet it is painfully apparent to all that the teaching of this subject is sadly neglected in most medical schools. In but very few schools is that systematic instruction given, which is essential to the full appreciation of the subject, and even clinical instruction in this branch is often relegated to a secondary position.

NEW MUNICIPAL HOSPITAL, BOSTON.—A new cottage hospital has been planned, for the treatment of women, in Boston Harbor. It will be located on property belonging to the city on Long Island. The first ward building that will be built will be 140 feet long, with a capacity of 100 beds. The amount of the appropriation is $50,000, with an increase expected in future years.

THE LEPER-PRIEST OF SURINAM.

The editor of the *British Medical Journal*, once in commenting on the life work of Father DAMIEN of Molokai, quoted that sentiment of EMERSON, which declares that "Nothing truly great was ever achieved without enthusiasm." The same sentiment is equally applicable to another, but comparatively unknown priest who has recently died in the service of a colony of forlorn lepers. Father JOHN BAKKER was truly a hero of the type of DAMIEN, and like him contracted leprosy and died of it in consequence of his labors. Father BAKKER'S field was near Batavia, in Dutch Guinea or Surinam. He was a Redemptorist priest, a native of Amsterdam, Holland, about fifty-eight years of age. During the greater part of the last twenty years his life has been devoted to the care of lepers. The first signs of his malady appeared nine years ago, while he was living at a plantation called Livorno, a short distance from Paramaribo, the capital of the province. For the past six years he has resided in the Batavia leper-colony, with the expectation that he would die there with only his fellow lepers around him. It is reported that he suffered greatly towards the last of his sickness, being confined to one small room, and yet maintained a cheerful and heroic aspect through it all.

Concerning the field in which his best years were spent, it is said that there are not less than three thousand lepers in the country. Many of these reside at the capital city, staying in their houses during the day time, but greatly given to wandering about at night, regardless of law or sanitary precaution, and not at all amenable to discipline. The Governor, a man of enlightened views, has done much to check the spread of the disease, and is about to establish a hospital for the systematic treatment of suitable cases.

The points of parallelism between the two leper-priests, whose names appear above, and their lives of voluntarily exile, are sufficiently numerous to create in us no little surprise that so obscure has been the fame of one, while the other has engaged the attention of princes and rulers, and his fate has been narrated again and again in all its mournful but romantic details. If we mistake not, Father BAKKER preceded Father DAMIEN in his departure from Europe, and is in point of fact the true pioneer in this line of desperate missions. And, further, it would appear that he was the first one of the two who became affected with leprosy. But honor to them both—*par nobile fratrum*—they were doubtless unconscious rivals in heroism.

BLOOD-LETTING IN URÆMIC CONVULSIONS.

DR. SAMUEL WILKS, veteran physician at Guy's hospital, is reminiscent, in a recent *Lancet*, of the good old days of blood-letting. He remembers seeing too many interesting persons snatched by this agency from the brink of the grave, to be unmindful of its claims, and he attempts to find excuses for the present day and generation in its neglect of phlebotomy. Of his success with the lancet he writes the following:

"A young woman was brought into the hospital in a dying state, gasping for breath, and livid; there was a mitral bruit, engorgement of the lung with hæmoptysis, albuminous scanty urine, and dropsy. We bled her from the arm and the effect was immediate, the breathing became tranquil, lividity passed from the face, and improvement continued from that time. In cases of *uræmic convulsions* the effects of bleeding are very striking; the right heart is relieved, and poisoned blood is removed from the system. One case of this kind, indelibly fixed in my memory, is that of a dressmaker, who, I believe, is still alive. I was asked a few years ago to see this patient, who had been in convulsions all night. I found a middle-aged woman in constant convulsive movements, froth issuing from her mouth, quite comatose, and almost pulseless. The whole body was livid and the extremities cold. The doctor said she was dying, and allowed me therefore to bleed her. I took away a small wash hand basin of blood, and while yet flowing, the lividity passed off, the convulsions ceased, the body gradually became warmer. Her life was as clearly saved by the bleeding *as if I had dragged her drowning out of the water*, and this is more than I can say of drugs." With this, are other instances of the same tenor.

A UNION MEETING OF THE DISTRICT MEDICAL SOCIETIES OF NORTHERN OHIO.—A union meeting of the Northwestern the Northern, and the North Central Ohio Medical Societies will be held at Mansfield on Thursday, Friday and Saturday, November 5th, 6th and 7th.

SOCIETY PROCEEDINGS.

American Orthopedic Association.

Fifth Annual Session, held at Washington, D. C., Sept. 22, 23, 24 and 25, 1891.

ORTHOPEDIC SURGERY AS A SPECIALTY.

DR. A. B. JUDSON, of New York, in the President's address, said that orthopedic surgery is specially the domain of physical demonstration, where subjective symptoms give place to objective signs, where treatment is chiefly mechanical, and where results are recorded in degrees of a circle and fractions of an inch. It exists and thrives as a specialty, because the general practitioner concurs with the public in committing patients who, from the nature of the case, generally recover with some deformity and disability, to the care of experts.

DR. N. M. SHAFER, of New York, defined orthopedic surgery as that department of surgery which includes the prevention, the mechanical treatment and the operative treatment of chronic or progressive deformities, for the proper treatment of which special forms of apparatus or special mechanical dressings are necessary.

DR. V. P. GIBNEY, of New York, proposed a definition as follows: That department of general surgery which includes the prevention, the mechanical treatment and the operative treatment of chronic or progressive deformities.

ORTHOPEDIC NOSOLOGY.

DR. W. R. TOWNSEND, of New York, advised the construction of a uniform nomenclature for orthopedic affections, to facilitate the taking of histories, and to increase the value of reported cases. A committee was appointed for this purpose.

THE LATE MR. THOMAS.

DR. A. J. STEELE, of St. Louis, paid a friendly tribute to the late Mr. Thomas, of Liverpool, a Corresponding Member of the Association, whose methods have been so widely discussed, and whose influence is felt in many branches of orthopedic practice.

CRURAL ASYMMETRY AND LATERAL CURVATURE.

DR. H. L. TAYLOR, of New York, described two cases in which the leg was two inches, and one and one-eighth inches short respectively. Both cases were in young women. The short limb was larger and stronger, the shortening was chiefly below the knee, and there was no lateral curvature.

DR. A. HOFFA, of Wurzburg, Germany, described a specimen which proved that in one instance the shortness was due to union of the neck and shaft of the femur at an acute instead of an oblique angle.

DR. F. BEELY, of Berlin, illustrated with specimens of lateral curvature and ingenious models, the changes which occur in the bodies of the vertebræ preceding rotation, explaining how the paraspinous sulcus is shallow and broad on the concave, and deep and narrow on the convex sides, a condition which is reversed in the lumbar region by the absence of ribs.

SPINA BIFIDA AND CLUB FEET.

DR. H. A. WILSON, of Philadelphia, related the case of a child of four years. The ordinary methods of reducing the deformity of the feet excited suppuration, which resisted treatment for six months, as long as the patient remained under observation. There were sensory paralysis and deficient circulation in the lower extremities. The same intolerance of surgical treatment thwarted all attempts to treat the spinal tumor.

DR. L. A. WEIGEL, of Rochester, had had similar trouble with a similar case, but found that when the child was older, it was possible to treat the deformity of the feet with success.

DR. A. E. HOADLEY, of Chicago, related a case of spina bifida, in which good result had followed an operation in which he did not attempt to repair the vertebral deficiency, but had simply turned up large flaps, and united them by silk sutures.

DR. T. M. L. CHRYSTIE, of New York, reported a case of congenital equino-varus, with absence of great toe and contiguous bones of the instep. Mechanical treatment speedily reduced the deformity, with a gain of symmetrical gait.

DR. W. E. WIRT, of Cleveland, related an interesting and unusual case of club-hand and club-foot, with other congenital malformations.

DR. HOFFA said it was evident that all cases of club-foot do not have the same causation. The cases reported were due to some fault in the earliest stages of development.

SPASTIC PARALYSIS AND SPINA BIFIDA.

DR. W. N. BULLARD, of Boston, reported a successful operation by Dr. C. L. Scudder, of Boston, for the relief of spastic paraplegia in a child with spina bifida. He thought the paraplegia not due directly to the spina bifida, but to the accompanying hydrocephalus. He advocated electrical treatment, and faradization rather than galvanism.

DR. WEIGEL reported a case in which division of all shortened tissues, and the use of a brace, had secured a favorable result.

DEFORMITY AFTER KNEE-JOINT EXCISION.

DR. J. C. SCHAPPS, of Brooklyn, said that after excision, the two united epiphyses make a mass of soft bone, in each end of which is inserted a long lever. With this leverage, it is possible to restore and maintain a straight limb by simple mechanical treatment.

DR. A. M. PHELPS, of New York, thought that recurrence of deformity can be prevented by liberal resection of the hamstrings.

DR. HOFFA said that relapse often occurs from incomplete removal of diseased tissue, and that when excision is done in early life, and all disease removed, marked shortening will not occur.

DR. BEELY said that flexion could be prevented by over-correction, but at the risk of further over-correction as the result of locomotion. Apparatus designed to prevent recurrence of deformity should relieve the limb from the weight of the body.

DR. TAYLOR objected to free division of the hamstrings, as these muscles are useful in balancing the pelvis on the femur, even after motion at the knee is abolished.

DR. J. D. GRIFFITH, of Kansas City, had prevented flexion by removing all the disease, and without dividing the hamstrings.

DR. SCHAPPS said that in many patients under 10 years, excision was to be preferred to mechanical treatment.

KNEE TROUBLES IN LOCOMOTION.

DR. SHAFFER related a number of cases in which an elongated patellar ligament had caused pain and difficulty in locomotion.

DR. AP M. VANCE, of Louisville, thought that the ligament might become shorter if not constantly stretched by use. Rest was indicated.

DR. GIBNEY cited a case in which rest for one and a half years had not caused shortening.

DR. SHAFFER said his patients had been benefited by giving lateral support, thus converting the joint into a true hinge.

ATROPHY IN JOINT-DISEASE.

DR. E. G. BRACKETT, of Boston, argued that atrophy is due to disease, and not entirely to reflex irritation.

DR. A. G. COOK, of Hartford, said that atrophy of the foot, often very marked, can be only the atrophy of disuse.

DR. J. K. YOUNG, of Philadelphia, believed that the atrophy in question is the result of reflex interference with nutrition. In hip disease, it appears first in the thigh muscles, especially the adductors.

ATROPHIC ELONGATION.

DR. ROSWELL PARK, of Buffalo, described the atrophic elongation conspicuous in the lower extremity. As the result of disuse from disease, with avoidance of pressure on the bone ends, the bone lengthens more rapidly than its fellow. This is illustrated in growing children with disease of the tibia or femur, and is noticeable in some cases of hip disease.

TREATMENT OF HIP DISEASE.

DR. PHELPS said that traction and fixation should be enforced, to prevent destruction by intra-articular pressure. Ankylosis is the result, not of fixation, but of disease. The patient should be put to bed from three weeks to four months, and should then wear the lateral traction fixation splint which was exhibited. Children under 3 years are placed in the plaster of Paris portable bed, which was also shown.

DR. WIRT exhibited a new device for traction, in which the force of the lever is changed into rectilinear instead of circular motion, without key, screw-driver, wrench, buckle or strap.

DR. R. H. SAYRE, of New York, said the invention gave accurate and easy adjustment in the direction of traction, but in the direction of relaxation, the control was defective.

DR. A. J. GILLETTE, of St. Paul, was satisfied with the results obtained by the use of Thomas' splint.

DR. VANCE said he practiced fixation at the hip, but believed much depended on the surroundings of tbe patient.

DR. SHAFFER believed the best results can be obtained by the use of the long Taylor traction splint. He thought results should not be reported till six years had passed, as relapses were not uncommon.

DR. RIDLON, of New York, said a splint should secure immobilization by antero-posterior leverage, as in Thomas' splint, by an action identical with that of the Taylor spinal brace.

DR. STEELE approved of the combination of the English method of rest with the American plan of traction.

DR. TAYLOR practiced rest in bed with traction in the acute stage, to be followed by a splint which allows locomotion.

DR. SAYRE thought but few cases required lateral traction. When the inflammation had ceased he applied passive motion. If the pain and tenderness following last more than twenty-four hours the passive motion had not been rightly used.

DR. E. M. MOORE, of Rochester, believed that a joint only *moderately* inflamed, demands motion. He employed traction with a certain amount of motion.

CONGENITAL DISLOCATION OF THE HIP.

DR. PHELPS exhibited apparatus for the treatment of this affection, and described his method, and its results.

DR. E. H. BRADFORD, of Boston, had modified the apparatus in previous use by adding an appliance with which the patient is allowed to walk about. The joint is thus protected as in convalescence from hip disease. These appliances he had made of aluminum for the sake of lightness.

DR. C. C. FOSTER, of Cambridge, said the best recorded result had been obtained by Dr.

Buckminster Brown, whose patient was treated by mechanical means in bed.

DR. A. HOFFA had operated by deepening the acetabulum, which is practicable from the thickness of the pelvis at this point. At first, he sewed a periosteal flap over the trochanter, but this is unnecessary. Two months ago he examined his first case, two years after the operation, and found a movable joint, freedom from the characteristic gait, and absence of lordosis.

MR. HOWARD MARSH, of London, divided these cases into (1) those in which the bone slips about on the wall of the pelvis and (2) those in which it is fixed. The majority belong to the second class and in these operation is useless, but is more properly applicable to those cases of the first class in which the head is high up and movable. The anterior position is the most favorable, because lordosis, which depends on the backward displacement of the head of the femur, is absent.

DR. RIDLON said that, as subjects for treatment, anterior dislocations are more hopeless than posterior ones.

DR. DE F. WILLARD, of Philadelphia, said treatment should be by forcible attempts at reduction, to excite inflammation, followed by traction and systematic exercise.

MALIGNANT DISEASE AND POTT'S DISEASE.

DR. JUDSON reported three cases in which Pott's disease and malignant disease of the vertebræ had been confounded by himself and other observers. In one the diagnosis was made ante-mortem. The patients were four-and-a-half, thirty-five, and forty-two years respectively. The chief diagnostic points are (1) deformity present in Pott's disease, absent in malignant disease; (2) local disability; and (3) local pain, both absent in Pott's, and present in malignant disease.

DR. WILLARD had seen two cases in which his diagnosis was confirmed post-mortem.

DR. GIBNEY reported a case in a man of forty years, in which he and others had been baffled in diagnosis. There was sarcoma of the fifth and sixth cervical vertebræ.

MR. MARSH related the case of a child which was extremely difficult to diagnosticate, and which proved to be malignant in character.

SYPHILITIC POTT'S DISEASE.

DR. RIDLON said that in this form, the onset is more rapid, the pain and disability greater, the kyphosis sharper in outline, and abscesses often appear before deformity. If recognized lesions of hereditary or tertiary taint are present, treatment should be by large doses of mercury and iodide of potassium.

DR. B. LEE, of Philadelphia, referred to cases of this origin, which had come under his observation.

POTT'S DISEASE IN THE OLD.

MR. MARSH had observed instances of suppurative tuberculosis in the metacarpus, tarsus, testis, cervical glands, knee and hip in eight patients between sixty-three and seventy-three years. But senile tuberculosis of the spine is most rare. He had seen two cases. The patients were sixty-four and sixty-five years respectively. The College of Surgeons of London possessed an osseous specimen of the action of senile tuberculosis of the upper cervical vertebræ. In his "Studies of Old Case Books," Sir James Paget had recorded a case of Pott's disease in a gentleman of fifty-five, attended with angular curvature.

DR. SAYRE recalled the case of a patient, æt. 55, who recovered from Pott's disease with paraplegia and abscesses.

POTT'S DISEASE AND PREGNANCY.

DR. T. H. MYERS, of New York, had collected twenty-five cases of labor in fifteen patients recovered from Pott's disease. In no instance, did caries recur. But of seven cases in which the disease developed during pregnancy, three died, and three were left paraplegic. Normal parturition often follows in cases of deformed pelvis whose measurement would indicate that it was impossible. These patients should be examined by the obstetrician early in gestation.

DR. TAYLOR knew of many cured patients whose marriage had been followed by the birth of healthy children.

DR. G. W. RYAN, of Cincinnati, thought it was a question of allowing the tuberculous to marry. He knew of married women, deformed by Pott's disease, who had borne and raised healthy children.

DR. STEELE said one of his patients recovered from Pott's disease had borne six healthy children.

DR. LEE said one of his patients with a large lumbar kyphosis, had borne twelve children who, with the mother, are all in good health. He thought Pott's disease, even in the lumbar region, rarely produced narrowing of the pelvis.

DR. VANCE had seen a number of cases in which this deformity had not made labor of more than average difficulty.

PARAPLEGIA IN POTT'S DISEASE.

DR. BRACKETT said that relief from paraplegia may be confidently expected from continuous extension and fixation, even in cases of eighteen months' standing. This should be continued for some time after recovery.

DR. YOUNG reported two cases of complete recovery, in which there had been absence of sensation, a feature always of grave import.

DR. SHAFFER referred to a case in which the autopsy showed that a portion of the eighth dor-

sal vertebra had nearly cut through the cord, leaving but a slender thread.

DR. HOFFA said that in these cases, the spine should be put absolutely at rest. He had collected thirteen operations within the vertebral canal. Two died at once, two recovered, and would perhaps have done so any way. In the others, there were immediate good results but relapse soon occurred. The operation has no great future before it, and should be limited to those cases in which the processes alone are affected.

DR. S. KETCH, of New York, had now under treatment a patient who had been paraplegic for five years, but he still maintained a hope of effecting a recovery.

DR. HOFFA suggested that an abscess may be exerting pressure on the cord.

DR. MARSH said paralysis rarely depends on the pressure of an abscess; but, 1, on softening of the cord, 2, pressure of a displaced sequestrum, and 3, most common, on pressure from exudation. He would only operate after thorough trial of rest.

DR. WILLARD said we could not absolutely diagnosticate the cause. When there are extensive inflammatory deposits about the arches, laminectomy may relieve the posterior pressure and allow expansion of the cord.

DR. LEE said that in all cases of this form of paraplegia, suspension would materially hasten recovery.

ABSCESSES IN POTT'S DISEASE.

DR. TOWNSEND thought that, as a rule, these abscesses should not be opened. In some cases, aspiration should be done, and in others, the cavity should be opened and drained to prevent sepsis and danger to life. His views were based on the history of 380 patients, 75 of whom had abscesses.

DR. YOUNG suggested the division of lumbar abscesses into external and internal, according to their relation to the psoas fascia.

DR. VANCE advocated aspiration, repeated as often as fluid is detected. In this way he cures three out of five cases. The depot is thus kept small and the extent of subsequent operations, if necessary, is limited.

MR. MARSH had rarely obtained a good result by the use of the aspirator.

DR. RYAN said he had found aspiration to be a poor dependence. When interference becomes necessary, he believed incision to be the most conservative and effective procedure.

MR. MARSH said that, in his observation, it is best to open freely, evacuate thoroughly, and then apply pressure to assist in closing the cavity.

B. E. HADRA, of Galveston, said that on general surgical principles such abscesses should be evacuated.

DR. WILLARD would let dormant and caseating foci alone, liquifacting collections; he would aspirate and inject with iodoform emulsion, and if true pus were present he would incise, wash out with sublimate solution, and avoid undue manipulation, which might cause fissures which would let the tuberculous poison into the system. He would then suture the incision, and inject iodoform and boiled olive oil.

DR. BRADFORD said that, while he did not think the danger from opening large abscesses was so great as had been thought by some, he was aware that absorption of such abscesses is not at all uncommon.

DR. J. E. MOORE, of Minneapolis, said the evacuation of a spinal abscess is a matter of great surgical responsibility, as it is an aseptic cavity, difficult to protect from infection after operation.

DR. HOFFA would open only those abscesses which cause severe pain, or are likely to give rise to septicæmia.

DR. LEE would never open an abscess of this kind unless compelled to by the conditions mentioned by the last speaker.

DR. KETCH said there was danger that in our anxiety to treat a secondary feature we neglect the disease itself.

DR. SHAFFER would not say that incision was never advisable, but generally it is wrong to open one of these abscesses. A very large abscess cannot be washed out, and its disappearance may be confidently expected, especially if efficient mechanical treatment is practicable.

DR. MYERS said that it was proven, 1, that it was impossible to completely remove bacilli from the abscess cavity, and 2, that bacilli-infected wounds at times, heal primarily. Infection is more imminent after incision, because the wound lays open channels of absorption.

WIRING THE VERTEBRAL PROCESSES.

DR. HADRA suggested that the spinous processes at the seat of the disease be exposed and then firmly wired together to secure rest, and prevent deformity. The operation, as he had performed it for fracture of the cervical spine, was extremely simple and effective.

DR. SAYRE thought the wires would not bear enough force to remove the weight from the vertebral bodies, and that outside protection would be necessary to prevent lateral and rotatory disturbance.

DR. JUDSON thought it was a question whether wiring was applicable through the long periods in which consolidation is delayed. Intolerance of the skin always prevents such pressure as we would like to make on the kyphos. The method proposed, circumvents this difficulty.

DR. R. WHITMAN, of New York, said that due consideration should be given to the difference

in development between the growing and adult spine.

DR. KETCH did not see how the proposed operation could take the place of apparatus.

DR. MOORE said it was a most simple and harmless procedure and notwithstanding the theoretical objections, he would accept the first favorable occasion to try it.

PROGNOSIS AND TREATMANT OF POTT'S DISEASE.

DR. KETCH had learned from 75 cured cases, that in length of treatment and degree of deformity, the upper region of the spine is most favorable, and the middle least of all, that paraplegia more frequently accompanies disease in the upper than in the lower regions, and that cases of traumatic origin, recover sooner than those of tubercular origin. Sudden deaths sometimes occur in cervical caries from interference with respiration.

DR. B. BARTOW, of Buffalo, said that the earliest important sign in the dorsal and lumbar regions is lateral curvature, dependent on nervous tenderness. Apparatus should be constructed to oppose the rotation accompanying the lateral curvature, as well as the antero-posterior deformity. He used the plaster of Paris jacket applied to effect the above objects.

DR. FOSTER said that extension in *bed* is the best method in the acute stage. Extension should be made by light weights, the cords leading over the head and foot of the bed and attached to waist-belts, chest-belts, and head-straps.

DR. WEIGEL reported a case of cervical Pott's disease, with abscess and paraplegia, successfully treated by extension in bed.

DR. RIDLON had kept patients in bed from three to four years, and had never seen a case which was not benefited generally and locally.

DR. RYAN said recumbency was the ideal treatment, but it is in many cases impracticable. He had found split plaster jackets efficient after the acute stage.

DR. LEE said that many years ago, when the plan had fallen into entire disuse, he was the first to adopt suspension from the practice of Dr. J. K. Mitchell. The apparatus was Le Vacher's head support and jury-mast, attached to a chair or go-cart, or to a doorway swing.

DR. SAYRE said that in the cervical and upper dorsal region, a metal posterior splint, supported on the pelvis, should be used with the jury-mast, and in the lower dorsal and lumbar regions, a plaster of Paris jacket with a jury-mast. Recumbency should be practiced in the acute stage; children should be placed in the wire cuirass.

DR. KETCH had been disappointed with the plaster of Paris and jury-mast in the cervical and upper dorsal region. He commended the Taylor apparatus and chin-piece. In the lumbar region almost any supporting apparatus will secure a good result.

DR. TAYLOR said that the antero-posterior lever secures rest and protection, and combats deformity. Old and neglected cases are especially amenable to treatment, as anchylosis is later and rarer than is generally supposed. Abscesses and paraplegia do not forbid a favorable prognosis.

DR. BRADFORD said that the plaster of Paris jacket was the readiest method, but had its disadvantages, that a steel brace gave better support, but demanded more skill and care, and that recumbency was the surest way to prevent deformity, but, as a rule, was impracticable for the long periods covered by the disease.

TYPHOID SPINE.

DR. GIBNEY reported an additional case of typhoid spine, in a man of 45 years, in which, different from the cases previously reported, there was marked deformity in the cervical region, dating back to typhoid fever at the age of 22. Two years of pain and disability had immediately succeeded the typhoid attack. Usually, the symptoms had not appeared till one or two months after the fever.

DR. HADRA recalled an epidemic of typhoid with so much tenderness on pressure of the vertebræ, that the affection was at first thought to be meningitis.

RHEUMATIC SPONDYLITIS.

DR. RYAN said that this rare affection should not be confounded with rheumatoid arthritis of the spine. It is usually accompanied by rheumatic manifestations elsewhere. In the early stage, the symptoms resemble those of tubercular spondylitis. Later, the deformity is not angular, but resembles that of senile kyphosis. Treatment should be directed to the relief of pain by support, cautery and medication. In the chronic form, when pain has lessened, mobility should be encouraged by passive motion.

DR. HOADLEY deplored the confusion which is found in the nomenclature of these conditions which produce such a variety of results. He thought both rheumatism and osteo-arthritis were microbic diseases. If ligamentous structures interfere with motion, passive motion was proper.

DR. LEE was reminded of a case which was at first thought to be spinal myalgia, but which proved to be gouty disease of the cartilages, an infrequent affection. Apparatus afforded relief, but of course not a cure.

DR. RYAN said that gouty spondylitis is generally attended by manifestations in other parts of the body. He had failed to state that his patient had limited respiratory movements.

DR. VANCE related a case in which there was, in addition to the spinal affection, complete immobilization of the thorax, with chiefly diaphragmatic respiration.

DR. BARTOW had seen a case in which relief was afforded by the spinal jacket.

DR. GILLETTE reported a case which, at the first glance, resembled the deformity of Pott's disease, but which proved to be rachitic in its etiology. Improvement followed a few days after suspension was begun.

TORTICOLLIS.

DR. WHITMAN inferred, from the study of 264 cases, that torticollis was more frequent in females than in males, and that the two sides of the neck were equally liable. Acquired torticollis, being often the result of suppurating cervical glands, should be treated at first by mechanical support to secure rest and prevent deformity. Later, division of contracted parts, with careful after-treatment, should be practiced.

DR. HOFFA said that cases of fœtal origin have immediately after birth an atrophy of the face and head.

DR. WHITMAN thought that the asymmetry of the face and head was a late feature of torticollis due to muscular action on the growing bones.

SACRO ILIAC DISEASES.

DR. LEE said the sequence of events is as follows: 1. Injury of the synchondrosis. 2. Subacute inflammation. 3. Irritation of the nerves of the joint, transmitted to the nearest plexus. 4. Resulting pain in the sciatic. The sciatica should be considered the result, not the cause, of all the trouble. In nine cases out of ten, neuralgia is the effect and not the cause of any trouble. As stooping in sacro-iliac diseases is injurious, he had devised a handy instrument with which the patient can pick up an object from the floor while remaining erect.

ELECTION OF OFFICERS.

DR. BENJAMIN LEE, of Philadelphia, was elected President, and DR. JOHN RIDLON, of New York, Secretary, for the ensuing year.

DOMESTIC CORRESPONDENCE.

LETTER FROM NEW YORK.

(FROM OUR OWN CORRESPONDENT.)

In the official report of Drs. C. F. MacDonald and Samuel S. Ward, the physicians appointed to supervise the four electrical executions at Sing Sing Prison in July last, which has just been made public by the Superintendent of State Prisons, many points of interest are to be found. In the killing of Slocum, the first man executed, a pressure of 1,458 volts, through electrodes in contact with forehead, temples and left leg, was applied continuously for twenty-seven seconds. When the current was broken, an examination showed that the pulse was beating strongly, and one or two minutes later, a noisy and regular respiration was established. The same pressure was again applied for twenty-six and one-fourth seconds, at the end of which time life was completely extinct.

In the case of the next man executed, Smiler, a pressure of 1,485 volts was applied three times for periods of ten seconds, with brief intervals intervening, and between each of the three periods the electrodes were freshly moistened. At the end of the third application, the pulse was found to be beating so firmly and strongly that, although no effort was made at respiration, the circuit was again closed for nineteen seconds, when the man was declared dead. In the case of the third man, Wood, three contacts of twenty seconds each were made, and an examination then showed that respiration had permanently ceased, while no pulsation could be felt at the wrist, and no heart beat could be detected on auscultation. An extremely fine, faint crepitation could be heard, but nothing else. As in the preceding instance, the pressure was 1,485 volts. In the case of Jugiro, the fourth man, a like pressure was applied three times for fifteen seconds, with intermissions of twenty seconds each. When the current was finally broken, a very slight fluttering could be felt at the wrist. Extreme heat was noted in the region of the knee, just above the point where the lower electrode had been applied, and a thermometer held against the skin for only fifteen seconds ran up to 115°, while the sensation conveyed to the hand was such as to render it probable that the temperature had reached, if not exceeded, the boiling point of water. Within fifteen minutes after the withdrawal of the current the chest was bared, and the cessation of the heart-beats confirmed.

As in the brief report to the warden of Sing Sing Prison, published shortly after the execution, the physicians express their positive conviction that unconsciousness was instantaneous and continuous from the first moment of contact in each instance. In order, however, to ensure that death supervene as speedily as possible, they think it is necessary to continue a current of the voltage employed in these cases for from fifty to sixty seconds. In each case the temperature of the water near to, and at the edges of the electrodes, was raised nearly, if not quite, to the boiling point, so as to blister the skin more or less extensively. There was absolutely nowhere any smoking, charring or burning.

Before going to the Medical and Surgical Congress, and after their return from Washington, Sir William and Lady MacCormac were the guests of Dr. Lewis A. Sayre here, and on Wednesday, September 30, at Dr. Sayre's hour, the distinguished London surgeon gave a clinical lecture in the amphitheatre of Bellevue Hospital, during the course of which he performed an exsection of the elbow-joint. Dr. Sayre's myriad friends throughout the country will be glad to hear that, notwithstanding the gratuitous and malicious report published a short time since in one of the morning papers, that he was hopelessly invalided and had permanently retired from practicing and teaching, he has quite recovered from his severe illness, and has once more regularly resumed his valued instructions in connection with the chair of orthopædic surgery at Bellevue.

In addition to "Laloo, the double-bodied Hindoo boy," there is at present on exhibition in this city a remarkable double-headed and double bodied monstrosity that was with Barnum when he had his show in London, but has never been in America until now. In this instance, while there are two entirely separate heads and pairs of shoulders and upper extremities, the bodies are united for a short distance, the right and left axillæ respectively to a little above the hips, and from there down there is but the body of one person. There is complete use of the four arms, which are well developed, but the legs are not sufficiently strong to bear the weight of the parts alone without some additional support to supplement them. The sex is male and the two boys are said to be possessed of more than average mental capacity. Their faces are bright and intelligent, and they speak French and Italian fluently. Consciousness and sensation are entirely separate in the two, and one may be sleeping while the other is awake. Curiously enough, one lower extremity seems to belong to each boy exclusively; so that the boy on the right feels no sensation when the left leg is pinched or pricked, and the boy on the left is unconscious of any irritation applied to the right leg. These conjoined boys were born in Italy sixteen years ago, and their mother, Antonia Battista, a stout, healthy woman of 36, accompanies them here. The day of their birth was the 4th of July, and they might with propriety have been named after George Washington and Thomas Jefferson; but as their parents were probably ignorant of the significance of that glorious anniversary, they were christened simply Giovanni and Giacomo.

In connection with the St. Thomas House, with its meeting hall, school-rooms, work-rooms, library and gymnasium, the noble charity which Mr. Flower, the Democratic candidate for Governor, founded and endowed as a memorial of his son, there is a well appointed diet kitchen. This is conducted by the "Helping Hand Society," with a hired matron in special charge, and large quantities of beef tea, mutton broth, and other articles of nutriment are dispensed from it to the sick poor of the parish and the neighborhood.

It is stated that the surgeons of the New York Hospital some little time since made an unsuccessful attempt at skin grafting with the skin of frogs in a case of extensive burn. Six dozen of the finest specimens to be had in the market were selected and fed and attended with the greatest care, so as to have them in the best possible condition at the time of the operation. Some thirty grafts about the size of a twenty-five cent piece, taken from the backs of as many well fattened frogs, were used at one time, and it seemed at first that there was every prospect of success. The final result, however, was a total failure, as the grafts were not possessed of sufficient vitality for the desired purpose. Still, it is an ill wind that blows nobody any good, and for some time the house staff luxuriated on the choicest frog legs. P. B. P.

Editor of The Journal:

Dear Sir:—I beg to ask you, through THE JOURNAL, the following questions:

1. Is a regular physician, who graduated at a reputable homœopathic college and practiced the same, but has since disavowed and refuses to practice homœopathy, and applies to the American Medical Association or any auxiliary for membership, would he be eligible?

2. In the Code of Ethics of the American Medical Association, what is meant by the term "regular?"

G. M. CLOUSE,
Sec'y Central Ohio Medical Society.

1. Yes, and given all needed professional support. Any other course would smack of the intolerance and bigotry of the dark ages.

2. The term "regular," as used in the Code of Ethics of the American Medical Association, refers to one who has graduated from a reputable medical college, and in practice conforms to the methods of professional conduct enunciated by the Code of Ethics of the American Medical Association.

MISCELLANY.

THE SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION.—The fourth annual session of the Southern Surgical and Gynecological Association will be held in the Hall of the House of Delegates, in the city of Richmond, Va., on Tuesday, Wednesday and Thursday, November 10, 11 and 12, 1891, under the Presidency of Dr. L. S. McMurtry, of Louisville. The Secretary, Dr. W. E. B. Davis, of Birmingham, Ala., is arranging a full and interesting programme, and the Chairman of the Committee of Arrangements, Dr. Hunter McGuire, of Richmond, announces that the facilities for a successful meeting are complete. This Association is essentially a working organization, and is doing a great work in the Southern States. The three volumes of Transactions already issued are highly creditable to any society or country, and have elicited the highest commendation from the medical press in this country and Europe. The meeting in Richmond promises to be the most successful the Association has held. Members of the profession generally are cordially invited to attend.

Official List of Changes in the Stations and Duties of Officers Serving in the Medical Department, U. S. Army, from October 3, 1891, to October 10, 1891.

Surgeon William H. Forwood, U. S. A., granted leave of absence for one month, on account of sickness.

Col. Charles T. Alexander, Chief Medical Purveyor U. S. A., relieved from duties of attending surgeon and examiner of recruits in New York City, and assigned to the charge of the medical purveying depot in that city.

Official List of Changes in the Medical Corps of the U. S. Navy, for the Week Ending October 10, 1891.

Surgeon S. H. Dickson, ordered to Marine Bks., Washington, D. C.

Surgeon A. Magruder, detached from Marine Bks., Washington, D. C.

Surgeon N. McP. Ferebee, ordered to the U. S. S. "Atlanta."

Surgeon M. C. Drennan, detached from the U. S. S. "Atlanta."

Surgeon J. R. Tryon, ordered to the U. S. S. "Chicago."

Medical Inspector J. C. Walton, detached from the U. S. S. "Chicago," and granted six months leave.

P. A. Surgeon J. F. Keeney, from the U. S. S. "Minnesota," and to the Naval Hospital, New York.

P. A. Surgeon R. P. Crandall, from the Naval Hospital, New York, and to the Naval Laboratory.

Asst. Surgeon Robert Boyd, from the Marine Rendezvous, Boston, and to the U. S. S. "Chicago."

Asst. Surgeon A. R. Alfred, from the U. S. S. "Fern," and to the U. S. S. "Kearsarge."

Asst. Surgeon M. F. Gates, from the U. S. S. "Kearsarge," and to the U. S. S. "Fern."

Surgeon Howard E. Ames, ordered as delegate to the Public Health Association, Kansas City, Mo., October 20, 1891.

Asst. Surgeon James H. North's resignation accepted September 8, 1891.